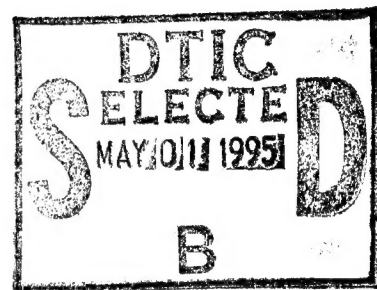# NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

IMPROVING INFORMATION DISSEMINATION
FOR THE DEFENSE BUSINESS MANAGEMENT
UNIVERSITY

by

Thomas M. McGrath and Maurice R. Vargas

March, 1995

Principal Advisor: Myung W. Suh

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The DBMU provides course and training information to customers located worldwide. Distributing information on paper to their customers is becoming inefficient and expensive. This thesis describes the implementation process of an Internet homepage for the DBMU. A look at the legislation that is being enacted, and how it will provide the basis for using electronic information dissemination within government is also addressed. The thesis presents a recommendation that the DBMU, and other DoD agencies with similar information dissemination problems provide unclassified information to its customers via the Internet. This thesis also provides a number of items that need to be considered when using Internet resources to distribute information.

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IMPROVING INFORMATION DISSEMINATION FOR THE DEFENSE BUSINESS MANAGEMENT UNIVERSITY

Thomas M. McGrath
Lieutenant, United States Navy
B.S., Virginia Polytechnic Institute & State University, 1989

and

Maurice R Vargas
Lieutenant, United States Navy
B.A., University of Hawaii , 1985

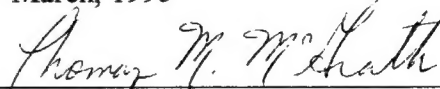Submitted in partial fulfillment of the requirements for the degree of

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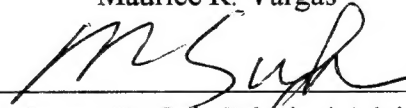March, 1995

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Thomas M. McGrath

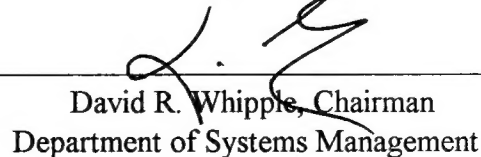_____
Maurice R. Vargas

Approved by: _____
Myung W. Suh, Principal Advisor

_____
Stephen F. Hurst, Associate Advisor

_____
David R. Whipple, Chairman
Department of Systems Management

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ABSTRACT

Information has never been as accessible as it is today. The Internet has evolved into the Information Superhighway through which information can be exchanged and shared across geographic boundaries. The purpose of this thesis is to discuss the possibilities of utilizing Internet resources to meet the Department of Defense's (DoD) information dissemination needs. This thesis will look at the advantages and disadvantages of three methods for distributing information across the Internet. In order to learn more about the possibilities provided by the Internet, a case study using the Defense Business Management University (DBMU) is conducted.

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I. INTRODUCTION

A. OVERVIEW

The idea of exchanging and sharing information freely, across systems, and throughout the world has never been closer to becoming a reality than now. With the rapid growth of the Internet, people from all over the world now have the opportunity to exchange ideas and information in the new environment called cyberspace. The amazing thing about the Internet is the amount of free information that is available on it. People from totally different backgrounds can login to the Internet and enter into discussions with others who are interested in the same subject. Organizations are learning how to reach their customers quickly and more efficiently by providing up to the moment information on products and services.

The purpose of this thesis is to look at the Internet, and describe some of the technologies available which can be used to help individuals and organizations within the Department of Defense (DoD) distribute information throughout the world. As a basis for the study, we looked at one particular information dissemination tool and applied it to a DoD organization to help meet some of their information distribution needs. Specifically, this thesis will discuss the construction of a prototype World Wide Web homepage built for the Defense Business Management University (DBMU).

The DBMU is tasked with providing education and training to the DoD work force. A major concern of the DBMU is being able to provide timely and accurate information to its customers. This is no simple task since their customers are located worldwide. By constructing a homepage to meet the DBMU's common problem -- distributing information to a large number of people dispersed over a large area, this thesis will provide a framework for people within the DoD to follow in order to make informed decisions about available Internet technologies which could provide a viable and much needed solution to their information distribution needs.

B. BACKGROUND

1. Mission of the DBMU

In today's environment of dwindling resources, it is critical that the DoD be able to manage itself efficiently. One way to ensure this happens is by providing quality education for DoD financial management employees. This will result in a stronger, more dynamic work force which can support new organizational structures and business systems throughout the DoD. While the provision for continued education is being met by DoD schoolhouses, there is a need for a systematic framework which can assess DoD's needs. In addition, this framework shall eliminate duplication of classes, and provide development and delivery of high quality standard instruction. The DBMU, in cooperation with existing DoD schools, will provide this framework.

The DBMU was created on December 12, 1992, under the Defense Management Report Decision 985 [Ref. 1]. Its main purpose is to identify and standardize the training and education needs of the DoD Financial Management work force, and then to develop and deliver curricula which will provide this education. To gain a better understanding of the goals of the DBMU, their mission statement is as follows:

> The DBMU provides the education and training to members of the DoD work force who seek to enhance their competencies related to the various occupational fields of business and general management. The goal is to prepare the work force to become business specialists, analysts and managers with the knowledge, skills and abilities in modern business concepts and principles to operate effectively in a future characterized by work force diversity, improved productivity tools, greater competition of resources, technological improvements and a financial environment more closely resembling the demands of a market economy. The success of many of the defense management initiatives depend on our ability to instill effective business management leadership abilities into the DoD workplace; business management employees who can translate education and training into action in the workplace. [Ref. 2]

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2. DBMU's Organization

The DBMU operates under the authority, direction, and control of the DoD Comptroller, and is within the organization of the Defense Logistics Agency (DLA) [Ref. 3]. Currently, John Raines is the President of the University. Reporting directly to the President are two committees currently headed by Geri Manning, Director of Academic Programs and Jim Howard, Director of Curriculum Improvement [Ref. 1]. "A Policy Council of senior DoD management officials, named by the DoD Comptroller, provides advice and counsel in overseeing the operations of the DBMU." [Ref. 4] Figure 1 shows DBMU's present organizational structure.
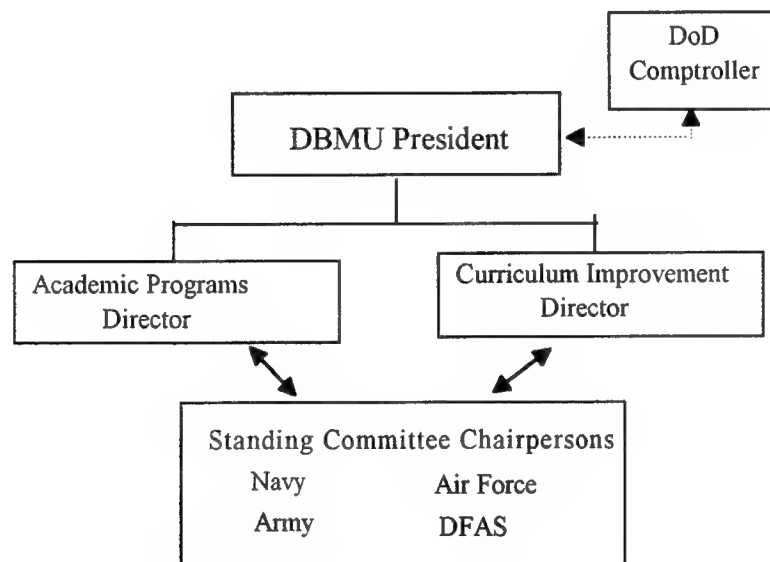
Figure 1 DBMU Organizational Structure [Ref. 4]

3. DBMU's Method of Operation

Standing committees representing the Comptrollership, Analysis, Budget, and Finance and Accounting, manage the curriculum content and its future development. Each committee is comprised of subject matter experts from the Component staffs, Office of the Secretary of Defense (OSD), and component school representatives, and is headed by a subject matter expert chairperson. These committees review existing courses in their field of expertise, and make recommendations about whether certain courses should be updated, consolidated, eliminated or added. To add to the experience of each committee, a representative from the DoD comptroller, who is considered a subject matter expert, is assigned to each committee on a one year rotational basis. These subject matter experts provide current and relevant information about departmental procedures. This information ensures that courses include material critical to the development of DoD's financial work force. [Ref. 2]

Although the standing committees have the capability to make changes to courses in order to keep them up to date, it is the DBMU that must translate these efforts into some type of standard course outline. This central control over curricula is needed to ensure that quality control is maintained with regards to the form and substance of how concepts and business practices are taught throughout the DoD. Once learning objectives and course outlines have been completed by the curriculum and course development group, a consortium member is chosen to work with the DBMU staff in developing the corresponding lesson plans. [Ref. 2]

In order to understand the results of the process described above, the following list is an example of subject areas which were targeted by the standing committees as areas which needed to be redesigned in existing courses:

- Unit Cost
- Defense Business Operations Fund
- Performance Measurement / Management
- Financial and Managerial Accounting for Business Managers and Analysts

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- ◆ Productivity and Business Improvement methods for Business and General Managers
- ◆ Chief Financial Officers Act Implications for Business Managers [Ref. 2]

Through this curriculum review process, DBMU is learning that most of the associated business concepts are being taught in some method to the general work force. In some instances a course may need to be updated or modified in some way to fit the special needs of financial managers operating within the DoD environment. In other cases, subjects which are not business management related, but provide a good foundation for decision and communication skills need to be restructured and incorporated into general business management courses. In addition to courses being modified and added, cases need to be developed to provide the DoD financial management work force with the opportunity to apply what they have learned in the classroom. Only through relevant and up-to-date experience can financial managers feel confident in the decisions they make both today, and in the future. [Ref. 2]

The DBMU serves as a vital link in providing current and relevant training and education for DoD's financial managers. In order to provide this service to a large customer base, a new method for reaching a large and distributed work force is needed. No longer can conventional methods such as paper course catalogs and newsletters be used to provide valuable information because of a rapidly changing environment. As valuable resources continue to dwindle, the need for informed and well educated financial managers will become imperative. If the DBMU is to continue doing their mission, it must seek new methods of keeping their customers informed. The scope of this thesis is to address some of the methods available to the DBMU, and to apply this technology which will ensure that the DBMU continues to meet its goal of maintaining a well trained, well educated work force.

C. THESIS ORGANIZATION

This thesis starts by giving an overview of the Internet and the types of valuable resources available. Chapter II lays the foundation by explaining what the Internet is, how it got started, who controls it, how it is financed, how fast it is growing, and some

methods for connecting to the Internet. In addition, three main methods for distributing information on the Internet are described. The three sections which consist of Electronic Bulletin Boards, Gopher client and servers, and the World Wide Web, discuss the difficulty of operating and maintaining each, along with the advantages and disadvantages each technology has to offer.

Chapter III deals with the scope of this thesis by concentrating on the development of DBMU's homepage. The chapter starts off by describing what a homepage is and how it can help organizations distribute information to people all over the world connected to the Internet. A description of Hypertext Markup Language, the code used in building a hypertext document, is given briefly. The chapter concludes by providing some lessons learned from creating the DBMU homepage. Hopefully, these lessons will assist others interested in creating a homepage from making some of the mistakes we encountered.

Although the DBMU had requested a homepage be constructed as part of the thesis, we needed to know what kind of computer capabilities DBMU's customers possessed. Chapter IV discusses the survey conducted with a sample of DBMU's customers, and its results. Specifically, this chapter describes the types of questions asked, how the data was collected, and the research methodology used in order to gain some understanding of the information that was acquired.

Chapter V looks at new legislation which is being passed and is laying the foundation for the electronic storage and dissemination of information within government agencies. A few of the key documents such as the Paper Reductions and Information Resources Management Act, Freedom of Information Act and others are discussed in greater detail. Also some examples of government agencies which have changed the way they conduct business are described. The purpose of this chapter is to demonstrate the government's desire to make use of new technologies which provide quick, efficient flow of information. This chapter will hopefully make government agencies aware of the change that is occurring, and get them to start thinking of ways in which electronic

dissemination of information can help improve the way they distribute information to their customers.

Finally, Chapter VI will offer recommendations learned from constructing DBMU's homepage with a view to helping government agencies find the best method for meeting their information distribution needs. Chapter VI also includes a description of a site visit conducted at DBMU's head office in Crystal City, Washington, D.C. The homepage prototype constructed for DBMU was demonstrated, and interviews based on key personnel's reactions were recorded. The interviews were also used to gather insight into ideas held by DBMU staff on ways they could improve efficiency in the way DBMU conducted its operations. Since all of DBMU's customers are government agencies some conclusions about their computer capabilities, now and in the future, can be formed from the information gathered from the surveys. Based on the survey's results', some ideas will be discussed which could assist other government offices in redesigning their information distribution practices.

II. OVERVIEW OF AVAILABLE INFORMATION DISSEMINATION TECHNOLOGIES

A. INTERNET BACKGROUND

There is much discussion when it comes to finding a definition of the Internet upon which everyone can agree. Simply put, the Internet is a collection of individual networks from all over the world which communicate with each other through a set of agreed upon protocols. Connecting networks from all over the world allows the Internet to possess a vast wealth of information. In order to gain a better understanding for how information is disseminated on the Internet, many issues concerning the origin of the Internet, who administers it, financing, future growth, and accessing Internet resources are addressed in the following subsections.

1. Internet Origin

The Internet began as a U.S. Department of Defense (DoD) experiment over twenty years ago. In the late 1960's the DoD became interested in computer networks, although not much was known about the technology [Ref. 5, p. 54]. The agency in charge of the project was the Advanced Research Projects Agency (ARPA). It connected four computers in California and Utah using what was then a new technology, called packet switching [Ref. 6]. By the mid seventies, ARPA had several projects including a wide area network (WAN), called the ARPANET, and several networks which used satellite and radio transmissions for communication.

Although ARPA had made many advances in network technology, they realized the major problem of connecting two different systems. Each network was its own individual entity; computers connected within the same network could communicate easily with one another, but getting two separate networks to communicate was another matter.

The ARPANET was instrumental in solving this particular problem. It enabled researchers in different parts of the country, working on the project, to communicate their ideas back and forth to one another [Ref. 5, p. 55]. For this reason, the ARPANET became known as the backbone network. Another key role played by the ARPANET was

it allowed researchers the opportunity to prototype their ideas. Researchers used ARPANET as a conventional WAN to move data and ideas from site to site, and as an experimental network which they connected other computers to in order to test new network applications and software [Ref. 5, p. 55].

The result of this experimental network was the design of computer software which made it possible for different computer networks to communicate. Researchers worked individually, and in groups in order to interconnect different networks. Although the methods by which systems communicate with one another is complex, researchers were able to find a way to integrate various programs, making them appear to operate as a single software design.

In order to accomplish the task of interconnecting networks, a number of new protocols had to be created. Protocols are the set of rules programmers base their applications on so that other computers can interact with the program. They are a description, in technical terms, of how a message should be formatted, and how a computer should respond to a message. Although there are over 100 protocols used to interconnect different networks, the name given to the suite of protocols is TCP/IP, which comes from the two most important protocols: Transmission Control Protocol (TCP), and Internet Protocol (IP) [Ref. 7, p. 30]. Although the exact details of how these protocols operate are beyond the scope of this paper, it is helpful to have a general understanding of what these two protocols do.

TCP is the protocol responsible for breaking the message into packets and attaching a sequence number with each packet making it possible to reassemble later, and ensuring that all parts of the message arrive. In addition, TCP inserts some error control information, and attaches a destination address. The amazing thing about the address is that it identifies a particular host on any network, whether it is in the same building or across the country. [Ref. 7, p. 30]

Once the message has been broken into individual packets, it is the job of the IP to ensure they are properly transported across the Internet to the receiving host. At the

destination, the TCP protocol checks to make sure there are no errors. If any are detected, a request for retransmission of the packet in error is sent. Once all packets are accounted for, and no errors are detected, the TCP will use the sequence numbers to reassemble the message. [Ref. 7, p. 30]

Up until the early 80's, many of the sites attached to the ARPANET were military and government agencies. One agency, the National Science Foundation (NSF), tried to make use of the ARPANET, but found the bureaucracy too stifling. In response, the NSF created five supercomputer centers, and made them available for scholarly research. The NSF used ARPANET technology to connect users to their computer centers using 56,000 bit per second (56k bps) telephone lines. It was impossible to connect every university to one of the five computer centers, since the cable used to carry the transmissions is charged by the mile. Instead, the NSF decided to construct regional networks. Each university in different parts of the country would be connected to its nearest neighbor. These networks would eventually be connected to one of the five supercomputer centers. By using this method, any computer could communicate with any other by forwarding the message from one network to another. [Ref. 8]

The biggest contribution by the NSF, towards the present day growth of the Internet, is it allowed everyone the opportunity to connect to the Internet. Until the NSF became involved in networking, only researchers in computer science, government employees, and government contractors had access to the Internet. The NSF promoted educational access by funding campus connections only if the campus had a plan for spreading the access around in their area. So everyone attending a four year college had the opportunity to become an Internet user. [Ref. 8]

Today, people are trying to go beyond college access to the Internet, by attempting to connect high schools and grade schools. As more and more people become aware of the Internet, and what it can do, the number of people connected increases. Many college graduates, having been exposed to the Internet, take their knowledge to employers, and persuade them to connect their businesses. The benefits of this Internet

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awareness points to continued growth, faster and more efficient connections, and new and improved technologies.

2. Internet Administration

Although individual networks which make up the Internet may be privately owned or operated by a CEO of a particular company, the overall Internet is not run by a single member or organization. Instead, the direction of the Internet rests with a group of individuals who comprise the Internet Society (ISOC). ISOC is a voluntary membership organization whose purpose is to promote universal information exchange through Internet technology [Ref. 8].

Through the ISOC, another panel is appointed called the Internet Architecture Board (IAB). The panel consists of invited volunteers, who specialize in computer technology [Ref. 6]. The primary responsibility of the panel is the technical management of the Internet. This is mainly accomplished by producing interconnection standards [Ref. 6]. The IAB decides when a standard is needed, and what the standard should be. The IAB is also responsible for allocating resources, such as addresses, and keeping track of unique numbers, i.e., the 32 bit identifier for each host on the Internet [Ref. 8].

With such a diversified number of users on the Internet, it is reasonable to expect disagreements on the way certain things operate. In order to handle users' concerns, a special committee known as the Internet Engineering Task Force (IETF) was established. The IETF listens to suggestions made by users, forms workgroups to investigate the problem, and based upon their finding, the changes may be implemented. [Ref. 9, p. 14]

3. Internet Financing

Since nobody actually owns the Internet, who pays for it? This is a very good question, and the answer is another amazing facet of the Internet. No one pays for the Internet; there is no company that bills the users or the networks connected to the Internet. Instead, everyone pays for their own network, and works out details to share the cost of connecting themselves to other networks. In this respect, NSF pays for its own

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network, NASA pays for the NASA Science Internet, and they decide among themselves, how to pay the cost for interconnecting their separate systems. [Ref. 9, p.15]

In order to assure user satisfaction, each network has established a Network Operation Center (NOC). These centers stay in contact with each other and ensure that all operations run smoothly. If problems occur within a network, the NOC can handle the problem directly. If there is a problem sending traffic from one network to another, the two NOCs involved will work together to correct the problem.

4. Internet Future Growth

It is difficult to get exact numbers on the amount of users and traffic that is passed on the Internet since no one company owns it. Nevertheless, there are companies out there which compile statistics, and make them available on line. One individual in particular is ISOC executive, Tony Rutkowski. As of May 1994, over 2,217,000 host computers were connected to the Internet [Ref. 10]. According to reports released at the Internet World'93 conference held in New York, the amount of global Internet users was 15 million, with 150,000 new members joining every month [Ref. 6].

The Internet has only recently become a truly international network. Up until a few years ago, the Internet only extended to allies of the United States, and overseas military bases. With the changing political environment, the Internet is spreading to countries all over the globe (see Appendix E). Currently there are over 40 countries connected to the Internet, and that number is constantly increasing [Ref. 10, p. 16]. Government regulations which prohibited Eastern European countries from access to the Internet have been lifted, opening the way for even more countries to take advantage of the Internet and its information resources.

Currently the major obstacle to expanding the Internet is a good supporting infrastructure, namely the telephone system. In the third world, and some European countries, a good telephone system is non-existent. Also the speed at which data can be accessed is limited to the speeds of the average modem, 9600 bits per second. This means the time to download large files could be considerable. Also many of the countries that

are connected to the Internet have only a few sites that can be accessed. However, with improving technology in the phone systems, these problems should be eliminated. Also as modems (modulators/demodulators) become quicker, and public servers offer a greater number of Internet services, more and more private homes will connect to the Internet. [Ref. 9, p. 16]

In the past, government limited or restricted commercial use of the Internet since it was established for the purpose of research and academic pursuits. Today, many of these laws and regulations are under review and will be changed. When this occurs, commercial use of the Internet will increase. Along with commercialization comes the private sector. As more and more people become aware of the Internet and all its resources, the need for home connections will increase. In the past, telephone companies did not want the added business of providing Internet connections. However, as more companies begin using the Internet, telephone companies are now aware of the profit in providing access to the Internet. As the these services become available through phone companies such as MCI, AT&T, and Sprint, look for the private sector to take advantage of accessing the Internet from home.

5. Accessing Internet Resources

Being able to access vast amounts of information is what makes the Internet such an incredible resource. Information on every imaginable topic can probably be found in some database, somewhere on the Internet. The curious user can access everything from news wires to stock information, to electronic books. On-line weather, sports, demographics, and even documents from the Library of Congress can quickly be accessed. Users have access, on a regular basis, to information about specific topics of interest by subscribing to various mailing lists. Users can become involved in every type of discussion or debate by becoming involved with different discussion groups.

A major function of the Internet is the capability to send electronic mail (E-mail) to anyone connected to the Internet, anywhere in the world. Also two people, in different parts of the country, can communicate to each other at the same time through a "chat"

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function.   As more and more government agencies and civilian businesses turn to the Internet to disseminate their information to the general public, faster methods of scanning the vast amounts of information available is needed.

The type of connection a person has to the Internet will determine the availability of certain resource tools.   Cost, knowledge of computer system architecture, and availability of hardware resources are all factors which impact an individual's decision on how to connect to the Internet.   A few of the primary methods are described in the following paragraphs.

Probably the cheapest, and easiest method of connecting to the Internet is through commercial on-line service providers.   At the present time, many of the Internet services are limited.   In fact most offer only E-mail and limited access to Internet newsgroups [Ref. 11].   Some of the well known providers include: America On-line; Delphi; Prodigy; and GEnie.   Most of these services provide a flat rate of less than $20 dollars a month. Commercial on-line service companies are the easiest way to connect to the Internet because much of the overhead of connecting to the Internet is provided in a simple to install software package provided by on-line commercial companies.   They will also handle any problems an individual might encounter when operating their software.   Although the services provided by these companies are limited, they are quickly expanding their Internet services to keep up with the demands of their customers [Ref. 11].

The optimum setup, in order to have access to all the benefits of the Internet, would be for an individual to be directly connected to a network which is part of the Internet itself.   Most universities, and more and more companies, have direct Internet connections through their own local area networks (LANs) that are themselves connected to the Internet [Ref. 6].   Direct connection to the Internet is expensive though, since a company or university must pay for a leased line.   These lines operate at speeds from 56 kbps, T1 links (special phone lines with 1.5 Mbps), and T3 links which carry an incredible 45 Mbps [Ref. 12, p. 8].   The cost of these lines are directly related to the speed at which they operate.   There also is a lot more hardware and software configuring required,

especially the installation of the TCP/IP protocol suite mentioned earlier. However, this job usually falls in the hands of a LAN administrator, and is of no consequence to the individual users.

Finally, if an individual wants to have full access to Internet resources, but has no access via work or school, there is still another option available. An individual can indirectly connect to the Internet through the services provided by a public-Internet access provider. This requires the individual to install the TCP/IP protocol suite on his or her own machine, have a modem installed, and have one of the serial communications protocols--Serial Line Interface Protocol (SLIP) or Point-to-Point (PPP)--installed as well. An individual must possess some knowledge of how his or her system operates in order to properly install the software. With a little perseverance and technical support, it is possible to do the setup yourself. The service can be provided usually for under $25 dollars per month [Ref. 6]. The disadvantage of this type of setup is twofold: first, if the provider's computers are heavily utilized, accessing the Internet can be slow; second, the speed of the individual's modem will also effect the speed at which data is downloaded from the Internet. Downloading a large file with a 2400 or even 9600 baud rate modem could take an extensive amount of time.

Now that a basic background on the Internet, and the different methods of connecting to it have been briefly described, the following three sections will cover the types of powerful tools available on the Internet to help individuals wade through the vast amounts of information available on the Internet. The three main technologies discussed in the following sections are Electronic Bulletin Boards (BBS), Gopher, and the World Wide Web (WWW). A brief description along with advantages and disadvantages of each technology will be addressed.

B. ELECTRONIC BULLETIN BOARD SYSTEMS (BBS)

1. What is a BBS?

BBS are computers which act pretty much like a bulletin board that can be found on any grocery store wall or in any office. Commercial software allows a computer

terminal to post messages, and act as a reading center for incoming callers. The software allows callers to post messages about specific topics or to browse specified files. Most software also allows callers to "download" desired files. Due to these functions, companies or organizations are able to disseminate information about a product or service to a large number of people at a relatively inexpensive price. This is true because now customers are able to access the information 24 hours a day, seven days a week. The cost of personnel answering the phones is also eliminated since everything is on-line.

BBSs can be operated privately or can be rented through commercial computer service providers such as Prodigy or America On-line. The Internet also provides many electronic bulletin boards which deal with a variety of subjects. These BBS are used primarily for discussion between members interested in the same topics. In this regard, individuals can read messages about a specific topic, post questions or generate responses to other individuals' remarks [Ref. 5, p. 157]. Due to the scope of this thesis, the focus of this section deals with privately operated bulletin board systems.

2. Operating a BBS

Many of the BBS software products available today are simple to use. In fact computer users with a basic understanding of their operating system can install, and manage a BBS [Ref. 13]. BBS software allows many on-line transactions in a single on-line session. Another benefit of BBSs is customers are able to access them with minimum equipment, i.e., a modem and some sort of communications software.

Since operating a BBS is relatively easy, many companies are finding this less expensive, and more flexible than using a public on-line service. "A four-line BBS from Clark Development called PCBoard, costing from $120 to $970, allows the system operator to set up hundreds of on-line conferences and file areas, and gives users fine-grained access privileges. Conferences, file areas, and E-mail are available to customers for the price of a phone call." [Ref. 13]

Setting up a BBS requires very little hardware. Systems which have a variety of features can be found for PCs running DOS or compatible systems. The optimum speed

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for systems should be 386 or higher, but 8088-based computers can be used, however, the number of callers which can access the system is reduced. Cards can be added to systems which will allow multi-user access, direct access from LAN workstations, even X.25, which allows access to public or private networks. Also extension or multimodem cards can be added to a system which will allow extra modems to be connected, enabling more access to the BBS. [Ref. 13]

Along with commercial off the shelf products, BBS software can be acquired through shareware. However, the drawbacks of using such software are lack of technical support, and a limited number of features which are standard on many of the commercial programs. Another factor which limits the way a BBS operates is the amount of storage space available. Larger storage spaces will accommodate more files, and allow a greater amount of messages to be posted on the system by users.

The system operator also has the capability to limit access to certain areas of the system either through the use of passwords or assigning of access levels [Ref. 13]. This type of security functionality keeps users from accessing sensitive data.

3. Advantages and Disadvantages of BBSs

The first advantage of BBSs is that users do not have to have access to the Internet to access the information stored on a BBS. All of the considerations mentioned earlier about connecting to the Internet are not needed in order to access a privately operated BBS. This means that BBSs are a simple way of getting information out to consumers who can actually access and use because most consumers have the necessary equipment needed to access a BBS.

Second, since BBSs can be operated privately, the system operator has the freedom to customize them to suit the information dissemination needs of the organization. Since all of these changes to a BBS can be done "in house," there is greater flexibility, and cost savings are reduced with regards to maintenance. In addition the timelines of information is always current since it can be easily updated if something changes [Ref. 14].

There are a few disadvantages associated with BBSs that must be mentioned as well. First, customers wishing to access a BBS outside the local area must pay the long distance tolls. This cost might be high if there is a lot of information contained on a BBS which a customer wishes to browse. Second, since customers using a BBS must use a modem and regular telephone lines, the speed with which a file can be downloaded maybe slow. Although there has been an increase in the speed at which modems operate, they are still slow when compared to a direct computer to computer connection, i.e., a LAN configuration [Ref. 14].

Another disadvantage of BBSs is they are not as user friendly as other types of information distribution methods. A caller does not get a nice graphical user interface (GUI) to point to the different files or messages on a BBS. If users are used to working in a DOS type environment, they should have no problem navigating through the data contained on a BBS [Ref. 14].

In conclusion, BBSs are a simple tool for individual organizations who wish to reach a wider number of customers by being available to them 24 hours a day, 365 days a year. They are reliable systems which can be operated by anyone with a basic understanding of computer software. This adds to a BBS's flexibility and low overhead. Finally, BBSs require very little hardware from the users who wish to access them. The next two sections cover more advance types of information dissemination tools which are used on the Internet, while their benefits may be greater, the price of getting them is also higher.

C. GOPHER SERVERS

Although information on the Internet is abundant, finding information about a specific topic can prove to be quite challenging. With the millions of computers connected to the Internet, it would be impossible for an individual to remember all the addresses of the computers connected to the Internet, and to look through all the files stored on each computer. In order to deal with the vast amount or resources available on the Internet, some type of cataloging system was needed to help users narrow their search for pertinent

information. The answer is an information browsing service called Gopher. Gopher is considered a browsing system because it allows users to review information on remote computers without actually having to retrieve the file. In particular browsing services:

- Locate remote computers that contain information of interest.
- Display information from a remote computer interactively.
- Read descriptions of the files stored on a remote computer.
- Retrieve or print a copy of selected information.
- Follow a reference found on one remote computer to related information stored on another remote computer. [Ref. 5, p. 189]

1. What is Gopher?

The title Gopher has two meanings associated with it: First, it's the name of Minnesota's mascot, the "Golden Gopher"; and Second, since a person can "go-fer" this or "go-fer" that with this resource tool, the name has been applied to all gopher servers [Ref. 9, p. 192].

Gopher was created in 1991, at the University of Minnesota, by a team consisting of Bob Alberti, Farhad Anklesaria, Paul Lindler, Mark McCahill, and Daniel Torrey [Ref. 7, p. 434]. Gopher was first constructed to act as a campus-wide on-line information system, tying together and organizing information from various offices on the Minnesota campus. Although the official documentation has never been published as a "standard-track" protocol, an estimated 5,000 gopher servers are in operation worldwide [Ref. 15].

Today, these servers act as document search and retrieval systems. These systems combine the best methods for searching and retrieving information stored in various formats [Ref. 16]. "To do this, gopher servers are organized by topic so that they look like one large database, rather than hundreds of smaller databases. They can access files in FTP archives, phone numbers from white pages servers, library catalogs and other databases with special-purpose (TELNET-based) servers, whatever." [Ref. 9, p. 192]

Gopher systems are user friendly because they are menu-driven [Ref. 5, p. 191]. These menus describe what the data is, and whether the data is on a file or in another menu. The amazing thing about gopher servers is not so much that they can access a variety of information, but that they eliminate system boundaries by accessing information all over the Internet without any additional commands from the user.

2. How Does Gopher Work?

Gopher's software and protocol operate based on a client/server model [Ref. 16]. The main advantage about networks is the sharing of resources. This is usually accomplished by two separate programs running on different computers [Ref. 7, p. 13]. In this case, one program asking for a particular resource is the client, the program providing the resource on request is the server (see Figure 2). This type of distributive interaction is what makes the Internet such an exciting and wondrous technology. By placing files on a server, others across the Internet can access the information by simply asking for it.
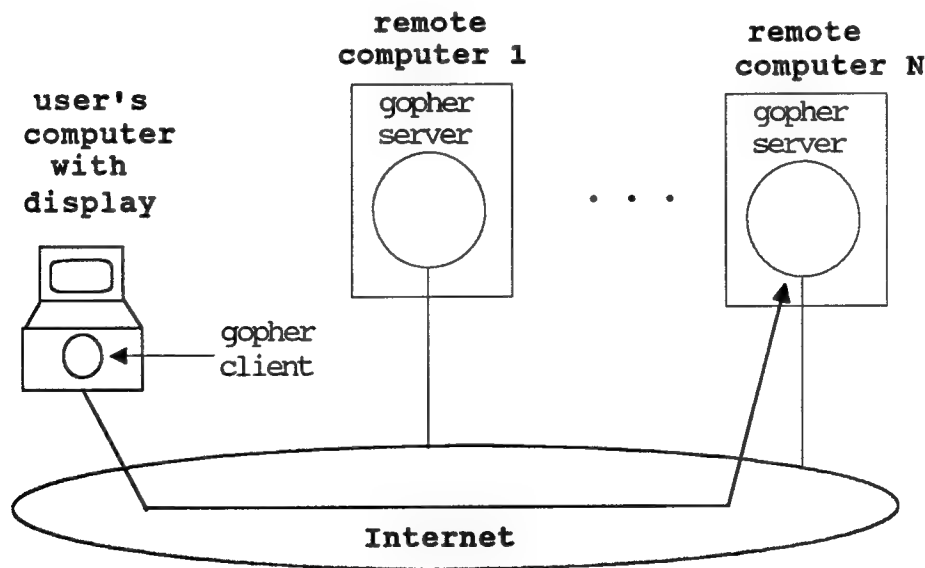
Figure 2 Gopher Client/Server [Ref. 5, p. 193]

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When a gopher client program is initiated, it accesses its home server, and asks for its main menu. The server program sends the menu, and the client displays it for the user. Once the user makes a selection, the client asks the server for more information. The server responds by sending information about the selection such as whether it is a text file, a host, another directory, a white pages server, and the IP address of where the resource resides. Regardless if the location is different from the current server, the client will do the same thing. The client will mark its present location and contacts the new server. This process continues until the actual document of what the user is looking for is accessed. [Ref. 9, p. 193]

> Eventually, you will choose a resource rather than a menu. Your gopher client will choose an appropriate utility for dealing with the resource you select, whatever it is. If it is a file, the client ftps it for you. If the resource is a "login" resource (i.e., a system you can log in to), it creates a TELNET session. If it's a collection indexed by Archie or WAIS, Gopher uses Archie or WAIS to find out what's relevant. The gopher client you are using allows you to speak to it in a screen oriented, menu-driven fashion. It takes what you say and turns them into real commands for the appropriate application. [Ref. 9, p.193]

3. Establishing a Gopher Client

In order for an individual to access a gopher server, a gopher client program needs to be set up on his or her personal computer or workstation. The program can be obtained for free, for a variety of platforms from the following site: ftp boombox.micro.umn.edu (134.84.132.2), in the directory /pub/gopher. The software comes with a "read me" file which explains the steps necessary to install the software onto a PC or workstation. With a little perseverance anyone with a basic understanding of their machine should be able to install the client software. [Ref. 16]

Since a gopher browser is an Internet resource tool, a person wanting to use this system must have access to the Internet. This means either having direct access to the Internet via a terminal, which is on a network connected to the Internet or by having access, via a phone line, to a system which is on the Internet. Of course this requires the

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TCP/IP protocol suite, a SLIP/PPP communication protocol, and a modem, all of which were addressed earlier in this chapter.

Another choice for individuals wishing to use a gopher browsing system is to TELNET to a public login site which has a gopher client program installed. There are a number of sites available from the Internet. Here is a couple to start with: consultant.micro.umn.edu (134.84.132.4); ux1.cso.uiuc.edu (128.174.5.59); and finally, gopher.msu.edu (35.8.2.61) [Ref. 16]. A couple of comments are included about this method of using a gopher browser. First, since an individual is a remote user on someone else's machine, certain privileges might be denied [Ref. 5, p.437]. Second, depending on what system a user logs on to, the amount of traffic on that system will directly effect the speed at which a gopher client program will operate. Finally, by using a client program on your own machine, the response is quicker and the program uses the custom features of the local machine i.e. mouse, scroll bar, etc. [Ref. 16].

No other configuring should be needed because the client server program will come with an address location of a gopher server. Once a link is established with the initial server, it is easy to jump to any gopher server on the Internet. In addition, most of the free client software will come with the following capabilities already installed:

- Search local WAIS indices.
- Query remote WAIS servers and funnel the results to gopher clients.
- Query remote ftp sites and funnel the results to gopher clients.
- Be queried by WWW (World Wide Web) clients either using built in gopher querying or using native http querying. [Ref. 16]

4. Establishing a Gopher Server

If anyone wishes to put information out on the Internet, setting up a gopher server is a viable solution. Like the client software, server software can be obtained free from the Internet location mentioned earlier. The server software can run on a number of platforms; all that is needed is a text file to be created showing the names of the files to be presented to a user, and a pointer which shows where the files are located [Ref. 15].

Anytime information needs to be added, deleted, or updated, an individual simply makes the changes to the appropriate file.

The gopher protocol comes already installed on the public access program. This protocol makes it possible for the server and client to interact with each other. "The gopher protocol identifies each item in a directory by a type character, the name or text displayed to the user, a selector string used by the underlying protocol (typically the path name used by the server to locate the object), the host name of the machine containing the object, and the IP address to be used". [Ref. 15]

Once a gopher server is established, it can be made public to the users on the Internet by sending E-mail to the maintainers of other gophers. All that is needed is the name of the server (as it is shown on the menu), the hostname, the port number, the person in charge of the server, a selector string (optional), and a short description of what information the server has on it [Ref. 16]. The administrative personnel on other gopher servers will use the information provided to allow their gopher server to point to the newly established server. It is this cooperation between gopher servers that constantly adds to the amount of new information available on the Internet.

In addition to gopher servers providing pointers to other servers, two tools which work in conjunction with gopher browsing systems are Veronica and Jughead.

Veronica is a server which attempts to index all the information provided by gopher servers. Periodically, a veronica server will contact computers on the Internet and gather lists of gopher menus. It stores this information on its own disk. When a user accesses a veronica server, the computer takes the search request and checks it against the gopher menus stored on its disk, and then sends back any corresponding items in the form of a menu. This tool allows users to access information without having to know the location of every gopher server on the Internet. This also benefits an individual or organization running a gopher server because their information can be distributed to millions even though their location is not known by everyone on the Internet. [Ref. 17]

Jughead servers operate in much the same manner as Veronica servers. The big difference is Jughead servers only search a specified area of the Internet. System managers who feel their users would benefit from information from a certain location on the Internet set up Jughead servers. Only gopher servers within the specified location are queried about the information in their menus. This information is stored on disk within the Jughead server. The main advantage of this type of server is that a user is able to confine his or her search to a specified area. The only limitation is that someone must have already set up a Jughead server in the area of interest. [Ref. 5, p. 456]

5. Advantages and Disadvantages of Gopher Systems

The biggest advantage of gopher browser systems is it's easy to use when compared to other Internet tools. The menu environment, and underlying protocols allow users to retrieve information without having to remember a number of different commands for accessing such tools as Remote Login (TELNET), File Transfer Protocol (FTP), or Wide Area Information System (WAIS) because Gopher has the capability to access these tools without any input from users [Ref. 16]. Since the client program is easy to use, the learning time needed to operate the software is less when compared to learning the different commands needed to access and retrieve a file from a computer on the Internet using one of the tools already mentioned.

Gopher servers are a way of making some sense of all the information on the Internet. Instead of simple text files contained in a database on some computer, gopher servers allow an individual or organization to present information in a logical, and easy to understand format. In addition, if an individual is not quite sure where to look for a piece of information, all he or she has to do is access one server, then follow the pointers to other systems until the information is found. Gopher is not very glamorous when it comes to the visual presentation of information, but it is quite a functional, and powerful tool for browsing through large amounts of information.

Since gopher browsers are Internet resources, a person needs to be connected to the Internet in order to make use of the tool. Of course it takes a lot more requirements

for an individual to gain access to the Internet. Also some knowledge of how to download software and install it on a machine must be performed before users can access a gopher server. This should not be too much of a problem since there are plenty of experts on the Internet who are willing to help.

Another disadvantage of gopher browsers is they are not all organized in a standard fashion. One of the benefits about the Internet is that no one person is in charge, dictating how things must be done. Although this is great for creativity, it makes it hard to find information. Since each gopher server designs how information is stored and defined, it is difficult to know exactly what is on a particular server without actually browsing through all the files stored on that server.

A final comment about gopher servers. Although they make it easier to browse through large amounts of information, it is still necessary for users to go through a number of menu levels before actually finding some pertinent information. There is also the possibility that after going through a number of menu levels, the search could come up empty, and force the user to back all the way out again. The gopher environment is also all text, and at the present time can only display information which is in text format. The next section deals with a powerful global information system which combines all forms of communication including, text, sound, and images. This new information space is called, the World Wide Web.

D. THE WORLD WIDE WEB (WWW)

As the number of networks connected to the Internet increases, the amount of information available increases more rapidly. There has always been a need to connect data, and organize it in such a way that information could be found quickly, and efficiently. Finally, "the concept of a universal information database -- data that would not only be accessible to people around the world but would link easily to other pieces of information so that only the most important data would be quickly found by a user" [Ref. 18] -- has become a reality through the WWW.

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1. What is WWW?

The official definition describes the World Wide Web as a "wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents." [Ref. 18] Established in 1990, the WWW was originally created as an on-line information exchange tool to facilitate the exchange of ideas for high energy physics research at CERN (a collective of European high-energy physics researchers) in Switzerland [Ref. 19].

WWW uses a graphical user interface (GUI), which uses embedded text to link together information stored in text, video, image, and sound format stored on different systems. These links are written in a language called, Hypertext Markup Language (HTML). A thorough description of HTML is given in Chapter III.

Currently the WWW offers the following Internet resources through hypertext, and in some instances, hypermedia:

- Anything served through Gopher
- Anything served through WAIS (Wide-Area Information Service)
- Anything served through anonymous FTP sites
- Full Archie services (a FTP search service)
- Full Veronica services (a Gopher search service)
- Full CSO, X.500 and whois services (Internet phone book services)
- Any finger services (Internet user lookup program)
- Any library system using PALS (a library database standard)
- Anything on Usenet
- Anything accessible through TELNET
- Anything in hytelnet (a hypertext interface to TELNET)
- Anything in techinfo or texinfo (forms of campus-wide info services)
- Anything in hyper-g (a networked hypertext system in use throughout Europe)
- Anything in the form of man pages
- HTML - formatted hypertext and hypermedia documents [Ref. 19]

2. How the World Wide Web Works

Like Gopher, the WWW operates based on the client-server model, where the browser is the client, and the source providing the information is the server [Ref. 17]. For

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this particular setup, the client program is the more complicated of the two programs. The server does not need to know what format the document is in. It simply responds to requests made by the client and sends whatever documents are needed (see Figure 3). The client program, on the other hand, must know how to interpret and display formatted text, paint images, and play sound data all of which could be received in different formats [Ref. 19]. In addition, the client program must also know how to respond to user inputs i.e., mouse movements and clicks, local menu selections, and keyboard commands [Ref. 19].
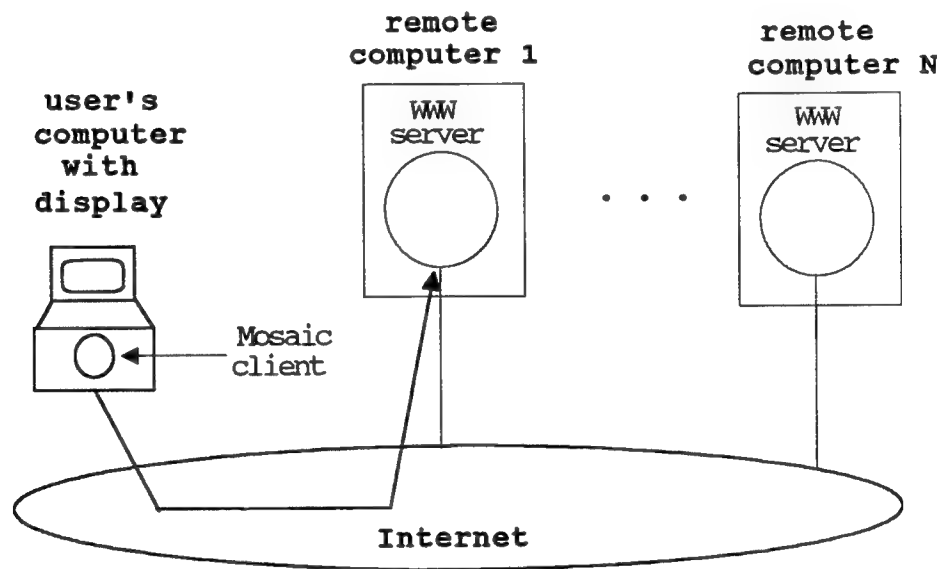
Figure 3 WWW Client/Server [Ref. 5, p. 218]

The WWW operates based on several protocols, including Uniform Resource Locators (URLs), HyperText Markup Language (HTML), and Hypertext Transfer Protocol (HTTP). The first two protocols will be discussed in greater detail in Chapter III.

HTTP is a communication protocol which allows speedy transport of data over wide-area networks. It allows a client to request and receive HTML documents, image and sound files, and other data streams from web servers. The protocol works in four

stages: The first phase consists of the connection made between the client and the server; Second, the client program requests some function of the server program; Third, the server responds to the client by sending the information; and Finally, the server closes the connection. [Ref. 19]

Web client software, also known as browsers, have also changed since the web was created. Originally, CERN had developed a simple line-mode client for use with TELNET. This basic software cannot display images or play sound. A few months after CERN had developed their ideas, the National Center for Supercomputing Applications (NCSA), began a project to build a GUI interface to the WWW. NCSA's software design group came up with a versatile, multi-platform and called it Mosaic. [Ref. 18]

NCSA calls Mosaic a "networked information system for wide area distributed asynchronous collaboration and hypermedia-based information discovery and retrieval." [Ref. 17] The amazing thing about Mosaic, is the simple user interface. The whole environment is based on pointing and clicking on the "underlined" or "highlighted" portion of the displayed text or images, which cause Mosaic to retrieve and display the related document [Ref. 17].

Getting client software in order to access the WWW is easy, and free by downloading it from a number of sites. The different types of browsers and their location will be discussed in Chapter III.

3. Advantages and Disadvantages of the WWW

The biggest advantage of the WWW is the ease with which data can be accessed. Since the WWW works with all the resources of the Internet, users can easily move from system to system, accessing all types of information. Another interesting thing about the WWW is information is presented in a manner which is closely related to the way people take in ideas. When reading a document, a word or sentence can link to other subjects or ideas which relate to the highlighted text. This makes learning about a topic more interactive.

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The information presented on the WWW can be stored and presented in a variety of formats. Users can pick a topic and have the information presented to them in a number of ways, i.e., video, graphics, text, and sound. Information is richer when it can be presented in forms other than just text. The WWW is an environment which adds to the creativity of individuals and organizations by being a medium where people can use the full spectrum of communications to get their ideas across to others.

The downside to the WWW is that it can only be accessed by individuals who are connected to the Internet. If an individual has a direct connection, then the world truly belongs to them. Although telephone access to a system on the Internet is adequate for other Internet resources already mentioned, it might not be a viable option for using the WWW. Large amounts of bandwidth can be consumed if a document contains images, sound, or video. It is not uncommon for a browser to report transfers of 100 kb or more when displaying an attractive "homepage" to a user. The slow speeds associated with dial up methods could limit the usefulness of browsers with high end capabilities [Ref. 19]. More limited line browsers can overcome this problem since they only display text.

In this chapter, we discussed what the Internet is, and how it has developed over time. This chapter also gave an overview of three different methods for distributing information, commenting on their strengths and weaknesses, and how to set them up. In the following chapter we will concentrate on "homepages", which are a tool for organizing and disseminating information on the WWW.

III. HOMEPAGE DEVELOPMENT

A. WHAT IS A HOMEPAGE?

A homepage is a Hypertext Markup Language (HTML) document that is "generally associated with a particular site, person, or named collection." [Ref. 20, p.13] For ease of understanding, a homepage is similar to a table of contents in a book in that it serves as an index to point the user to documents or media associated with that site. It is usually the first document viewed at a site. (See Appendix A)

HTML is the standard language used for creating readable pages for browsers with graphical interfaces on the WWW. "It is loosely related to, but technically not a subset of the Standardized Generalized Markup Language (SGML). HTML documents are nothing more than standard 7-bit ASCII files with formatting codes that contain information about layout (text styles, document titles, paragraphs, lists) and hyperlinks." [Ref. 20, p.18] (See Figure 4). A major advantage to using HTML is that it allows you to specify links to other documents. "Hypertext is basically the same as regular text -- it can be stored, read, searched or edited -- with an important exception: hypertext contains connections [or hyperlinks] within the text to other documents." [Ref. 20, p. 4] The documents that hyperlinks connect to are not limited to text files. "Hypermedia is hypertext with a difference: hypermedia documents contain links not only to other pieces of text, but also to other forms of media -- sounds, images, and movies. Hypermedia simply combines hypertext and multimedia." [Ref. 20, p. 5]

B. HOW DO YOU READ IT?

A homepage or HTML document can only be seen by utilizing a WWW browser. The browser may be "text-only" in which case the user would receive the text information minus any graphical images or pictures that are written into the code. "A Web browser works in a window and may be a software program on any computer with a graphic interface, such as Macintosh or an IBM-compatible computer with Microsoft Windows." [Ref. 20, p. 12] Most popular WWW browser software programs include "Mosaic"

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File: tom.html -- This file is the Homepage which points to all other files.

```html
<html> <head> <Title>The DBMU Homepage of the World</title> </head>
<iMG ALIGN=middle SRC="dod.gif"></a>
<body>
<H1> <p>Defense Business Management University</h1> </hr>
<EM>"Committed to building an integrated, competency-based education and training
system to meet the future professional development needs of our workforce." --John
Raines, President, DBMU</EM><p>
<iMG ALIGN=top SRC="bluebar.gif">
</a> <h1>Welcome to our<s> On-line</s> Information System<hr></h1>
</p> <h3> <ul><A HREF="mission.html"><img align=bottom src="pball.gif">
Mission of DBMU</a></h3> </p>
<h3> <A HREF="president.html"><img align=bottom src="pball.gif"> Message
from the President of DBMU</a></h3></p> <h3><A href="organization.html"><img
align=bottom src="pball.gif"> DBMU Organization</a></h3></p> <h3> <A
HREF="/DBMU/catalog/catmain.html"><img align=bottom src="pball.gif"> Catalog of
Courses</a></h3>
<h3> <A HREF="software.html"><img align=bottom src="pball.gif"> Catalog
Software</a></h3>
<h3> <A HREF="dialog.html"><img align=bottom src="pball.gif"> Quarterly
Newsletter</a></h3> </ul>
<h2><hr>Other Interesting Information:<p></h2> <a
href="resources.html">Related Information Links</a><p>
</HR>
 <h3>For comments or suggestions please contact:
<address>sfhurst@nps.navy.mil</address> Steve Hurst DBMU - Homepage
Manager</h3>
</html>
```

Figure 4 DBMU Homepage Code

created by the National Center for Supercomputing Applications at the University of Illinois, Urbana-Champagne and "Netscape" created by Netscape Communications Corporation to be compatible with Mosaic. These software programs are produced in formats that allow them to be executed on most computers. "Currently versions of Mosaic can run on UNIX-based machines such as Sun, Silicon Graphics, and DEC workstations as well as IBM-compatibles running Microsoft Windows and Macintosh computers." [Ref. 20, p. 14] "Mosaic's novelty and power arises because it integrates access to multiple Internet services into a single, seamless browsing system. Mosaic uses information in the URL to automatically select an access mechanism from among such services as remote login, file transfer, and gopher." [Ref. 22, p. 221] "A Uniform Resource Locator consists of a short character string that identifies a particular multimedia document. Given a valid URL, a program like Mosaic can quickly retrieve the page of information to which it refers." [Ref. 22, p. 216] For example, the URL, "http://sm.nps.navy.mil/DBMU/tom.html", can be broken down into its respective parts: the protocol is "http", the server is "sm.nps.navy.mil", the document is located in the directory "DBMU", and the file is "tom.html". "Each URL specifies the protocol, server, and a document identifier used to retrieve a particular document." [Ref. 23, p.1]

The software to run the Mosaic or Netscape browser is available on the Internet and can be downloaded from the following anonymous FTP sites: For Mosaic, contact "info.cern.ch" and look in the directory "/pub/www" [Ref. 25], For Netscape, contact "ftp.mcom.com" and look in the directory "/netscape". Since the software is free it does not come with any user service or support. If support is desired then the full version of the software can be purchased from a commercial vendor; Spyglass Inc for Mosaic and Netscape Communications Corporation for Netscape. "These products are available for evaluation and academic/not-for-profit use (government organizations do not fall into the not-for-profit category in this program)." [Ref. 26]

C. ADVANTAGES OF HTML

Some of the advantages include:

- **Ease of programming.** A programmer can use any text editor to create HTML as long as it is capable of saving in ASCII format [Ref. 21, p.3]. Also, many software programs exist that will assist the programmer in writing HTML or converting text into HTML format.
- **Program "as you go."** It is possible to see immediately what your code is interpreted as by locally viewing the document through a WWW browser. "You can preview a document in progress with NCSA Mosaic (and some other Web browsers)." [Ref. 21, p.3]
- **Program can be made accessible quickly.** The only requirement to make the HTML program accessible is to place it on a file server and inform people about the Uniform Resource Locator (URL).

D. DBMU HOMEPAGE

1. Initial Development

Programming for the DBMU homepage was started on August 1, 1994. The page was accessible to the WWW on a local anonymous FTP server (ftp.nps.navy.mil) by August 15, 1994. (See Appendix A to review the actual code for the DBMU homepage and its related sections.) The initial construction involved the following items:

- A Message from the DBMU President
- The DBMU Mission Statement
- A Catalog of Courses offered by DBMU
- The DBMU Organizational Structure

A continuing work-in-progress, the homepage has never stopped growing and changing from its first "version". Most of the changes/additions have been in the way of adding hyperlinks to other locations (See Appendix A) that provide information pertinent or useful to the homepage for DBMU. The decision of where to initially place the homepage was based on accessibility by users of the WWW. The only local server available at the time for public uploading and downloading of files was the anonymous FTP server (ftp.nps.navy.mil) at the Naval Postgraduate School. Access to the files was not direct in that uploading of files was accomplished through a system administrator. The procedure to upload was to simply send the files to the server location and request that the

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system administrator place the files in a specific directory. Once placed in the directory, the location (i.e., ftp://ftp.nps.navy.mil/pub/DBMU/thesis /tom.html) was given to users who wanted to access the information While this process was cumbersome, especially if mistakes were made in the uploaded files, to have to go through it proved to be, at the time, the fastest method for getting the information accessible to WWW users. Since then the files have been transferred over to a WWW server where they are directly accessible to both the programmer and users of the WWW. While direct access to the files is convenient it also adds the responsibility of backing up and managing the files. Due to the move, the URL was changed from "ftp://ftp.nps.navy.mil/DBMU/tom.html" to "http://sm.nps.navy.mil/DBMU/tom.html."

2. Problems Encountered

During this initial exposure to the HTML language, some problems were found. The capability to place text anywhere on the screen is limited to the formatting codes available. What you write and format with code is not always what you see on the screen. This problem of code interpretation and display is a result of WWW browser software and changes in the development language HTML. Also, a problem exists of how to graphically display information that would be both appealing **and** informative to the user.

There are two well known WWW browser software packages in use today, Mosaic and Netscape. Mosaic is the older of the two. "In the first half of 1993, the first version of NCSA's Web browser [Mosaic] was made available to the Internet Community." [Ref. 20, p. 14] While Mosaic uses the original version of HTML, Netscape has included some command interpretation capability for the new version of HTML which is HTML + [Ref. 35]. "When completed, HTML+ should be backwards compatible with HTML and will support interactive forms, defined "hot spots" in images, more versatile layout and formatting options and styles, and formatted tables." [Ref. 20, p. 18] Newer commands contained in HTML+ are not readable by Mosaic. This leads to a problem of Mosaic users not seeing what Netscape users are seeing. The problem of a rapidly changing development language will continue to challenge browser software creators and

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even more so the programmers who seek to have as many people as possible access and successfully read their material with a multitude of WWW browsers. "HTML allows you to mark titles or paragraph marks, and then leaves the interpretation of these marked elements up to the browser. For example, one browser may indent the beginning of a paragraph, while another may only leave a blank line." [Ref. 24, p. 8]

The problem of relating information to people depends heavily on how they perceive it. HTML has the capability of incorporating graphics (i.e. pictures, drawings, etc.) along with text and hyperlinks. The combination of these three techniques (graphics, text, and hyperlinks) is very successful in getting people's attention as evidenced by the surge in WWW accesses. "From January to December 1993, the amount of network traffic (in bytes) across the National Science Foundation's (NSF's) North American Network attributed to Web use multiplied by 187 times. In December 1993 the Web was ranked 11th among all network services in terms of sheer byte traffic -- just twelve months earlier, its rank was 127." [Ref. 20, p. 8] Obtaining the proper balance in presentation is very difficult. There are helpful programming rules that exist as guideline such as "In general hypertext documents should be broken up so that each page does not occupy much more than a single screen." [Ref. 24, p. 16] With too much of a graphic, the reader will not focus on the text; too much text and minimal graphics, the reader would be better off with reading a book. It is difficult for a programmer to be both an expert in writing the HTML code and an expert in graphically arranging the information. What works well in meeting the presentation challenge is to provide a concise, quick index to the user without too much flash and decoration. Overuse of graphics not only distracts the user but also physically slows down the presentation of the page on the screen. Images take much longer to process and display than text and, therefore, must be selected very carefully for their effect.

In this chapter, we discussed what a homepage is and how it can be accessed. We also reviewed the history of the DBMU homepage, its implementation and some of the problems associated with developing HTML code. In the following chapter we will discuss the survey conducted of DBMU's clients and its findings.

IV. DBMU CLIENT SURVEY

A. SURVEY OBJECTIVES

As mentioned earlier in Chapter I, the purpose of the DBMU is to provide updated course and training information to DoD financial employees. Presently, the DBMU maintains contact with its customers by mailing a quarterly newsletter and distributing a yearly course catalog with updated class information. This is a timely and expensive method for distributing information to a large number of customers, located worldwide. The DBMU distributes 2600 catalogues at a cost of ten dollars each [Ref. 36]. They also distribute 4100 disks, which contain the course catalog in electronic form, at a cost of one dollar per disk [Ref. 36]. The DBMU has also installed an electronic bulletin board system which allows customers to dial in and download the catalog, the quarterly newsletter, and the files which will allow customers to access the newly developed WWW homepage.

To better understand the information dissemination needs of the DBMU, it was necessary to find out the technical capabilities of their customers. Since the DBMU was interested in looking for ways in which the Internet could aid in distributing their information, our survey was designed to find out if the DBMU's customers could access the medium on which we were going to distribute information. Since all of the DBMU's customers are DoD agencies, the survey also seeks to help determine the applicability of our findings to information distribution problems at the DoD level.

A sample was randomly drawn from a population maintained on two independent databases. One database consists of customers from the Defense Finance and Accounting Service (DFAS) centers located throughout the continental United States (see Figure 5). The second database consists of DoD offices which comprise the DoD standard distribution list (SDL). The DoD offices on the distribution list are located worldwide.
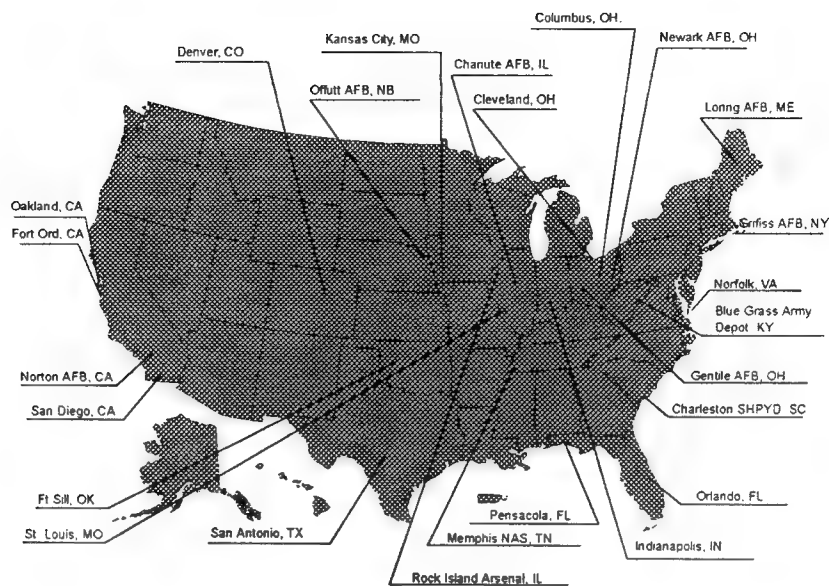
Figure 5 DFAS Site Locations [Ref. 4]

The following sections report results from the survey which was mailed in September, 1994 to a sample of customers from the two databases mentioned above. A total of 800 surveys were sent out, and 356 responses were received. The type of information gathered, and how it was analyzed is discussed in the rest of the chapter.

B. METHODOLOGY

1. Sampling Design

The DoD database consists of approximately 1200 addresses. Due to the time and cost involved in surveying every member of this database, we decided to use a sample of the population. We chose to conduct a random sample because we wanted a true cross section of the population. If this could be achieved, we felt confident about making generalizations about all the agencies stored in the database. A random sample of the population was acquired by selecting every third address from the DoD database. By selecting respondents randomly from the list, we tried to minimize any variations that might introduce a sampling bias into our survey. By reducing or eliminating the sampling

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bias, we hoped to get a true representation of the population from which the sample was drawn.

The second database, consisting of the DFAS centers, was much easier to survey since the database only contains 350 addresses. For the second group, we sent surveys to the entire populations stored in the database. Since the DFAS database is also the primary customer of the DBMU, an exact description of their capabilities was desired by the DBMU. By surveying every office, we believed an accurate representation about DFAS centers' technical capabilities could be attained.

2. Research Design

For the purpose of our research, descriptive analysis was more than adequate. The purpose of the research was to find out the capabilities of the DBMU's end users, i.e., what kind of computer system they do their work on, whether they have access to the Internet, what kind of operating system they run on their computer, etc. The actual survey that was mailed out can be found in Appendix B. Descriptive studies are designed to tell the who, what, when, where and how of a particular subject [Ref. 37, p. 148]. Descriptive studies are useful when the study concerns a univariate question such as whether DBMU customers possess the capability to access information stored on the Internet.

Due to the number of customers we needed to survey and the dispersed location of their offices, we felt the best way to gather information for our descriptive study was through the use of a mail survey. Other benefits in using mail surveys are the amount of time that is saved, contacting respondents that might otherwise be inaccessible, and being able to spend more time studying responses than is possible with either personal or telephone interviews [Ref. 37, p. 333].

The major weakness with mail surveys is non-response. A busy respondent might have every intention of filling out a survey, but loses it by placing the survey in a drawer or leaves it in some obscure location. With a large survey such as this with a short amount of turnaround time allocated, it is impossible to send a letter to individuals reminding them to fill out and send in their survey.

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Another problem with mail surveys is the lack of input the researcher can provide for answering any questions a respondent might have with a survey. To reduce this problem, the questions have to be concise and cannot probe too deeply. Also the survey itself must not take a great amount of time to fill out. Generally, people become uninterested or simply mark any answer to finish the survey if it takes longer than 10 minutes to complete [Ref. 37, p. 333].

To reduce these problems mentioned above, we created a brief 11 question survey which could easily be completed within 10 minutes. Since the information we needed to discover was relatively straight forward, the questions were very specific, and a list of all possible choices was provided for the respondent to choose from. We chose a multiple choice format versus open ended questions because it takes less time to fill out, it is easier to code the responses in order to conduct statistical tests, and it is easier to measure and analyze the data from a multiple choice question.

All of the questions were given to a group of fellow students to read and make any recommendations they felt were necessary to make the survey clearer. By allowing more people to see the survey before it was actually sent, we believed that any questions respondents might have concerning the questions would be accounted for. Finally, we sent the survey to a group of government financial employees located here at the Naval Postgraduate School since many of the customers who would receive the survey are financial employees as well. After looking at the results, we decided that there were no major problems in the construction of the survey.

Other steps taken to ensure a good number of returns was to include a cover letter from the President of the DBMU with each survey, stating the purpose of the study and asking for each person's help in providing the information requested. The letter also stated how the information was going to be used, and that the respondent would benefit from the study because it would improve the way the DBMU served them. The cover letter was also personally signed by the President of the DBMU.

All of the surveys were sent with return addressed envelopes. Postage was also free because government offices use metered mail for conducting business. Anonymity was not an issue since none of the questions were of a personal nature. However, since there was space provided on the survey for added comments, no names were used to track which information came from what office. Finally, a deadline date was placed on the survey in order to accelerate the response rate.

3. Data Collection

As stated earlier, the surveys were mailed out in the later part of September 1994. We received surveys back as late as January 1995. There were 150 responses from the DFAS database which contains approximately 350 addresses. Since all of the addresses were used from this database, we received 42.8 percent of the surveys sent out.

450 surveys were sent based on a random sample of the DoD database which contains approximately 1200 addresses. We received 206 or 45.7 percent of the surveys sent out. Since mail surveys with a return of 30 percent is considered satisfactory, we felt confident that the study had gathered a good representation of the two populations [Ref. 38, pp. 254-257].

The first step taken after receiving the data was to edit the raw data. Specifically, we were looking for any errors or omissions that the respondent might have committed. Any mistakes that were found were tagged and, if possible, corrected. The purpose of this whole first step was to facilitate the coding and tabulation of the data.

In order to prevent adding any bias (through incorrect data entry) into the study, a codebook was generated. This helped maintain consistency by establishing a set of coding rules which governed how data was entered. By using this process, we hoped that all data elements with similar problems were entered in the exact same manner. A brief description of how entries were coded, and some specific problems that were encountered with some of the responses are described in the following paragraphs.

All the questions with the exception of #10 were multiple choice questions. When entering data, we replaced the letter "A" with the number "1", "B" with "2" and so on

down the alphabet. The letter "G" was the highest response answer we had listed on the survey which corresponds to the number "7". Numbers were used in place of letters to facilitate the use of our statistical software package.

Three of the multiple choice questions contained a choice labeled "other". If the respondent picked this choice to name a specific type of hardware, operating system or future upgrade and it coincided with a generic system which was already given among the answers, the generic named answer was utilized. We felt the data would be biased by placing answers in the "other" category simply because the respondent felt that naming a system constituted filling out the "other" line in the question. Since we were interested in technical capabilities and not brand names, we did not feel this change would damage the study.

Question 10 represented a special problem in that it was a ranking question (see Appendix B). The question asked respondents to rank the biggest obstacle to implementing more advanced information technology in their office. Number 1 being the greatest obstacle and number 6 being the least. Two specific problems occurred with this question. First, some respondents failed to rank the list at all, and placed only a single mark among the six choices. Second, some respondents would partially rank the list, leaving one or few choices blank.

These errors and any other discrepancies were handled by placing the number "9" in the corresponding mistake. The number "9" simply was used as a flag to identify data that could not be used in any of the statistical tests we ran. By proceeding in this manner, we felt that the possibility of corrupting the data was too high, so it was better not to use the data at all. This method was used as well for questions left blank.

It is important to reemphasize that the steps taken during the data collection phase of the study, i.e., editing, coding, and codebook construction, were all performed to minimize any errors or biases in inputting data.

4. Data Analysis

Since the purpose of the study was to learn about the technical capabilities of the DBMU's customers, we used descriptive statistics to provide some answers to our question. All of the survey questions except for #10 provided nominal data. This means the characteristics of the scale used to measure data have no order, distance, or origin. Question 10 provided ordinal data, which means the characteristics of that scale have order, but no distance or unique origin [Ref. 37, p. 172].

Based on the type of data, two types of tests, measures of location (central tendency) and measures of spread (distribution or variance), were used to help provide answers upon which conclusions could be drawn. The names of those tests and a brief description of each is presented in this section.

The following are measures of location:

> The *mean* is the arithmetic average. It is the sum of the observed values in the distribution divided by the number of observations. It is the location measure most frequently used for interval-ratio data but can be misleading when the distribution contains extreme scores, large or small.

> The *median* is the midpoint of the distribution. Half of the observations in the distribution fall above and the other half fall below the median. When the distribution has an even number of observations, the median is the average of the two middle scores. The median is the most appropriate locator of center for ordinal data and has resistance to extreme scores, thereby making it a preferred measure for interval-ratio data - particularly those with asymmetric distributions.

> The *mode* is the most frequently occurring value. When there is more than one score which is the highest yet equal frequency, the distribution is bimodal or multimodal. When every score has an equal number of observations, there is no mode. The mode is the location measure for nominal data and a point of reference along with the median and mean for examining spread and shape. [Ref. 37, p. 472]

The following are measures of Spread. They describe how scores gather or scatter in a distribution:

The *variance* is the average of the squared deviation scores from the distribution's mean. It is a measure of score dispersion about the mean. If all the scores are identical, the variance is 0. The greater the dispersion of scores, the greater the variance. Both the variance and the standard deviation are used with interval-ratio data.

The *standard deviation* is the positive square root of the variance. It is perhaps the most frequently used measure of spread because it improves interpretability by removing the variance's square and expressing deviations in their original units (e.g., net profits in dollars, not square dollars). Like the mean, the standard deviation is affected by extreme scores.

The *range* is the difference between the largest and smallest score in the distribution. Unlike the standard deviation, it is computed from only the minimum and maximum scores; thus, it is a very rough measure of spread. Using the range as a point of comparison, it is possible to get an idea of the homogeneity (small standard deviation) or heterogeneity (large standard deviation) of the distribution. For homogeneous distributions, the ratio of the range to the standard deviation should be between 2 and 6. A number above 6 would indicate a high degree of heterogeneity. The range provides useful but limited information for all data. It is mandatory for ordinal data. [Ref. 37, p. 473]

The above measurements were used to test the data we received from the surveys. Some specific test applications and results will be discussed in the following section.

C. FINDINGS

In order to perform statistical tests on the data collected, we used a program called Statistical Package for the Social Sciences (SPSS), version 6.0. The information is presented basically in two forms. First, we used bar graphs to depict a visual representation of how often each answer was selected for every question on the survey. Second, we provided the statistical numbers, i.e., standard deviation, mean, mode, range, etc. These are presented for every question on the survey. All of the findings along with the raw data used in this study can be found in Appendices C and D. In this section a summary of the findings, based on some of the data collected, will be discussed.

Since our main research question was whether or not the DBMU's customers have the capabilities to access the Internet, we first needed to know what kind of computer systems were available to them in their daily work. According to DoD (see Figure 6) and DFAS (see Figure 7) respondents, the majority of computer systems used are 386 and 486 microprocessors.

DBMU Survey: DoD Study
Computer Type
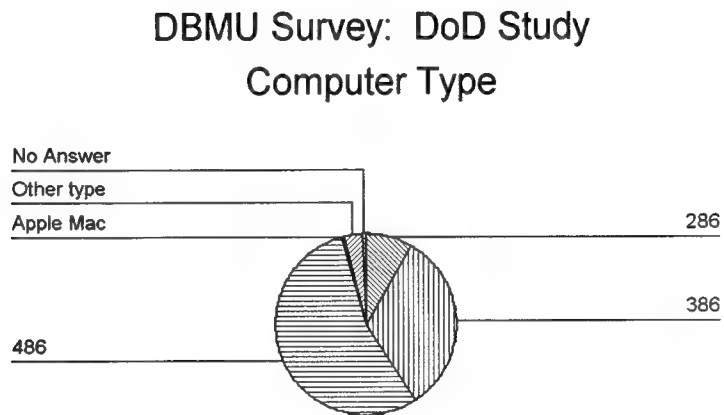
Figure 6 Pie Chart Displaying Primary Office Computer in DoD

DBMU Survey: DFAS Study - Computer Type
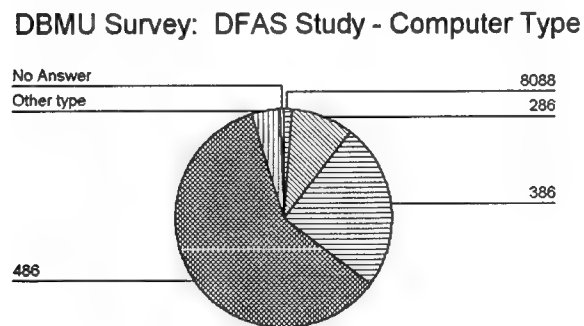
Figure 7 Pie Chart Displaying Primary Office Computer in DFAS

The study revealed that over 60 percent of DBMU customers have their workstations connected to a local area network (see Figures 8 and 9). This infrastructure would make it easier to connect to the Internet.

DBMU Survey: DoD Study
Local Area Network Connection
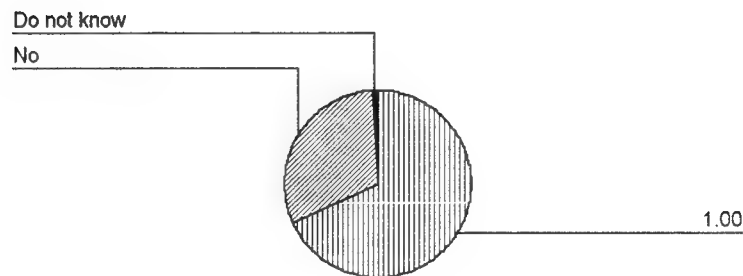
Figure 8 Pie Chart displaying LAN Connectivity in the DoD

DBMU Survey: DFAS Study
Local Area Network Connection
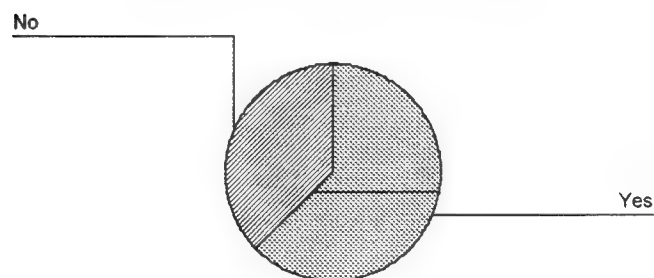
Figure 9 Pie Chart Displaying LAN Connectivity in DFAS

63 percent of the DFAS respondents said they had access to the Defense Data Network (DDN) while only 47 percent of the DoD respondents stated that they were connected to the DDN (see Figures 10 and 11).

DBMU Survey: DoD Study
DDN Access
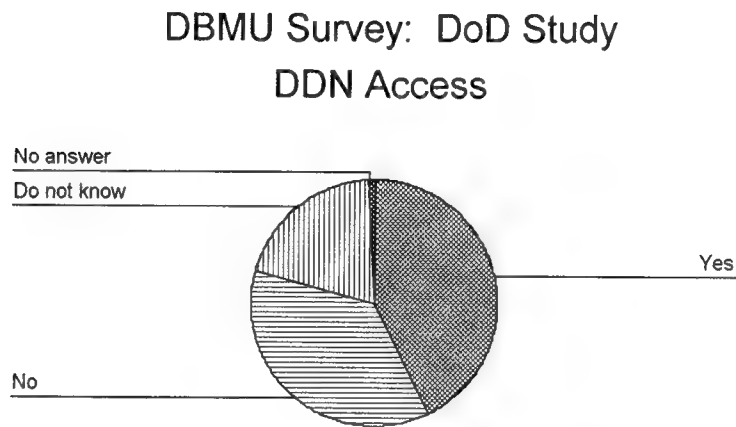
Figure 10 Pie Chart Displaying DoD Connection to the DDN

DBMU Survey: DFAS Study - DDN Access
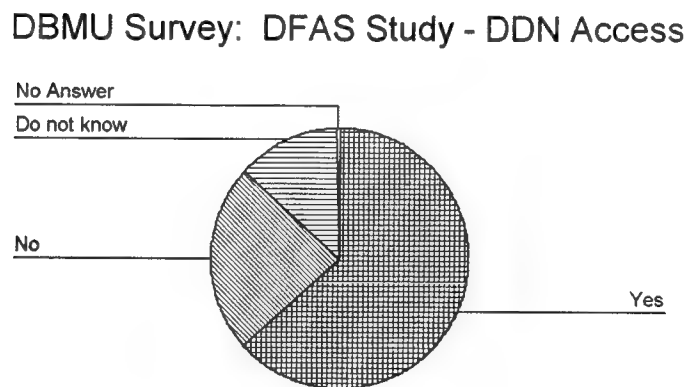
Figure 11 Pie Chart Displaying DFAS Connection to the DDN

We also wanted to know the amount of DBMU customers that have non-DDN connections, i.e., commercial Internet access. A high percentage of both DoD and DFAS respondents said they had no commercial connection to the Internet (see Figures 12 and 13). It is interesting to note that roughly the same percentage of both DoD and DFAS offices, 32 percent, do have commercial Internet access.

DBMU Survey: DoD Study
Internet Access
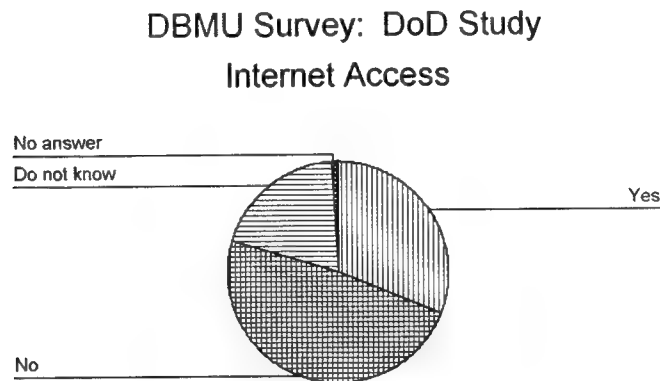
Figure 12 Pie Chart Displaying DoD Connection to the Internet

DBMU Survey: DFAS Study - Internet Acces
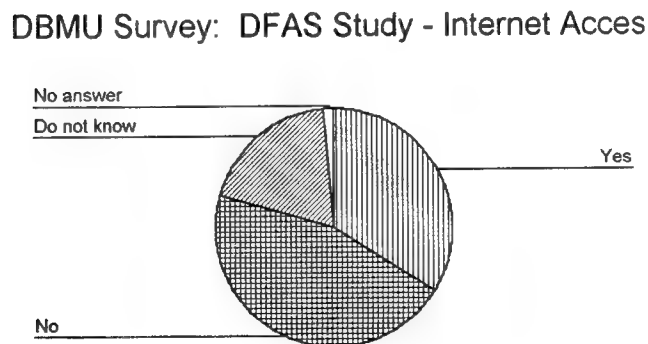
Figure 13 Pie Chart Displaying DFAS Connection to the Internet

A high percentage of DBMU customers like the idea of distributing information electronically (see Figures 14 and 15).

DBMU Survey: DoD Study
Electronic Information Distribution
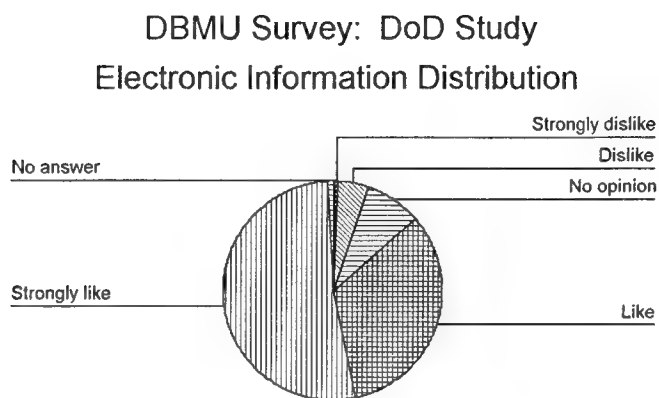
Figure 14 Pie Chart Displaying DoD Approval of Electronic Distribution

DBMU Survey: DFAS Study
Electronic Information Distribution
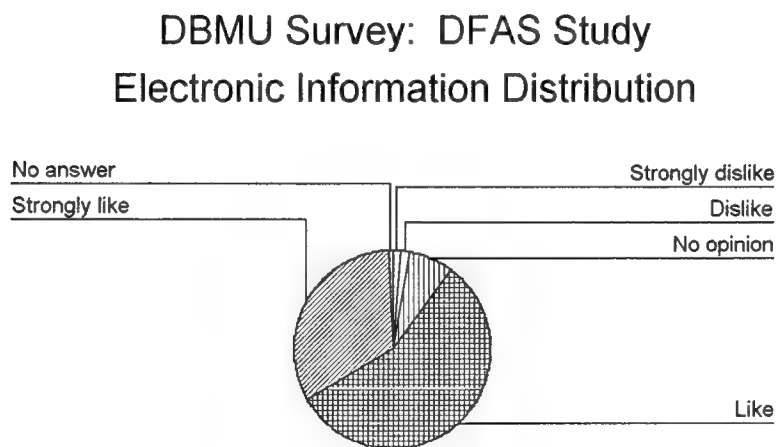
Figure 15 Pie Chart Displaying DFAS Approval of Electronic Distribution

The remaining questions in the survey were mainly used by the DBMU to gather descriptives on other types of capabilities such as multimedia, type of operating systems, modems, future upgrades, and number of employees in a work office. A complete set of bar charts and frequency distributions for these questions along with the actual data from the surveys can be found in Appendix D.

D. CONCLUSIONS

Based on this study a number of conclusions can be drawn. First, all of DBMU's customers use computers. Over 85 percent of these customers use either 386 or 486 microprocessors. Although half of the DBMU's customers say they do not have access to the Internet, 56 percent of the DoD customers and 66 percent of the DFAS customers say they do have a connection to the Defense Data Network (DDN). This does not make sense since the DDN does provide a non-secure connection to the Internet for the military. There are two possibilities which could explain this contradiction in findings. First, the services that are provided to DBMU customers are limited, i.e., they are only running Simple Mail Transfer Protocol (SMTP) which allows only E-mail or second, and probably more likely, the users are unaware that the DDN provides Internet access.

Another interesting finding is that over 63 percent of the DBMU's customers run their systems as part of local area networks (LAN). This means that these offices have the support of an information manager with the technical knowledge to connect systems together. This network manager would also possess the knowledge to connect a LAN to the Internet. Based on this we can infer that there is some form of technical support already in place at many of the offices surveyed.

70 percent of the DFAS centers and 86 percent of the DoD offices have a modem. This means there is the possibility of accessing the Internet through public on-line providers such as Prodigy, CompuServe, and America On-Line. The problem with this of course is the monthly connection fee.

As far as the attitudes of DBMU's customers towards distributing information electronically compared to paper, 85 percent of the DoD respondents and 88 percent of

the DFAS respondents stated they either liked or strongly liked electronic methods of distributing information compared to distributing information on paper.

A final item which proved interesting, but not surprising, was the responses gathered from question 10 which asked respondents to rank a number of obstacles to implementing more advanced information technology in their offices. Over 60 percent of DBMU's customers stated that funding was the biggest obstacle. Access to hardware was the second biggest obstacle for both types of customers. Apparently, fear of computers is not an issue with any of the DBMU's customers since it ranked last for both sets of populations.

A few steps could have been done differently to strengthen this study. First, question 10 could be rewritten so that respondents would not have to rank the obstacles. A number of responses either came back blank, or only a few of the items were ranked and the rest were left blank. Second, more time should have been given to the survey so that follow-up letters could have been sent, urging more people to send in their survey. Finally, a follow on question should have been added asking, "what types of services does the DDN provide to your office?" This question would show whether the user is aware of the resources available through DDN or not.

The study conducted for this thesis provided descriptive statistics on the technical capabilities of the DBMU's customers. Although the tests associated with descriptive analysis are not the strongest when compared to scientific methods, they were more than adequate for giving us some insight into whether providing information on the Internet was a feasible solution for the DBMU. Based on our findings, we feel that enough of the two populations warrant the possibility of using the Internet as a resource for disseminating information. The next chapter discusses the legislation being enacted which will provide the legal foundation for DBMU customers, and all government agencies to use electronic methods of storing and distributing information.

V. FEDERAL REGULATIONS AND INITIATIVES

A. REGULATIONS

There are many Federal regulations that direct the flow of information. The flow of information from the people to the government and the flow of information from the government to the people are both dynamic and require conscious administration. Current laws are pushing for a greater flow of information, in a greater number of forms, from the government to the people.

"HR 3695 [The Paperwork Reduction and Federal Information Resources Management Act of 1990] reauthorizes the Office of Regulatory Affairs (OIRA) to continue to purpose the goal of reducing the burden caused by Federal government information collections. The bill also recognizes that while control of the paperwork burden remains a priority, the information resources management responsibilities of OIRA, which have not been fully undertaken due to OIRA's emphasis on paperwork reduction and regulatory review activities, now require urgent attention." [Ref. 28, p. 16] Another statement in HR 3695 points out that the Federal government is aware of the rapid development of information technology and its effect on information dissemination. "Furthermore, the advances in information technology that have occurred since 1980, and even 1986, demand that this central office be rededicated and empowered to accept the challenge of coordinating dissemination, statistics, records management, information sharing, and the other information resources management activities in which the government must be involved. This committee realized in 1980 that the Act would have to be *flexible enough to allow for future changes*, and this reauthorization bill works within the structure set up then." [Ref. 28, p.21]

The applicable principles provided in the purposes of the Act are:

- To minimize the Federal paperwork burden for individuals, small businesses, State and local governments, and other persons;

- To minimize the cost to the Federal government of collecting, maintaining, using, and disseminating information; and

- To maximize the usefulness of information collected by the Federal Government (44 U.S.C. 3501). [Ref. 29, p. 52746]

This Act reflects the attitude that technology must be effectively utilized in today's government whether it is for information collection or dissemination.

The Freedom of Information Act (FOIA) has been a driving force in improving and mandating public access to government held information. "The FOIA is an access statute. It requires agencies to accept and consider requests for information from the public. Information that is not exempt from disclosure must be released." [Ref. 28, p. 25] The FOIA ensures that the public should have access to the information no matter what form it is in. "Thus, a person unable to use an agency information product on CD-ROM can still request the information under the FOIA on paper, magnetic tape, or other electronic media." [Ref. 28, p. 25] Some have thought that the FOIA is not broad enough to cover access to files maintained electronically although this is already a requirement of the FOIA. "The FOIA already requires agencies to accept FOIA requests for electronic records without any distinctions based on content. The FOIA already requires agencies to conduct thorough searches of electronic records using all reasonable means, including electronic searches and programming techniques." [Ref. 9, p.26] The intent of the FOIA is of a good nature but it is not always supported fully. "What is principally needed to improve operations of the FOIA is a better understanding of technology by the agencies and an even-handed application of the letter and spirit of the FOIA." [Ref. 28, p. 26] Also, the FOIA will continue to act as a separate force in providing accessibility to government information. "Nevertheless, the FOIA will always be available as an alternative mechanism to meet public access requests for information, separate from any dissemination activity by an agency." [Ref. 28, p.27]

In support of the Paperwork Reduction and Federal Information Resources Management Act of 1990, the OMB has written Circular A-130. "Circular A-130 provides uniform government-wide information resources management policies as

required by the Paperwork Reduction Act of 1980, 44 U.S.C. Chapter 35." [Ref. 28, p. 1]

Also, Circular A-130 has basic considerations upon which it rests. Some of those basic considerations and assumptions are as follows:

- The Federal Government is the largest single collector, consumer, and disseminator of information in the United States. Because of the extent of the government information activities, and the dependence of those activities upon public cooperation, the management of Federal Information resources is an issue of continuing importance to all Federal agencies, State and local governments, and the public.

- Government information is a valuable national resource. It provides the public with knowledge of the government, society, and economy -- past, present, and future. It is a means to ensure the accountability of government, to manage the government's operations, to maintain a healthy performance of the economy, and is itself a commodity in the marketplace.

- The free flow of information between the government and the public is essential to a democratic society. It is also essential that the government minimize the Federal paperwork burden on the public, minimize the cost of its information activities, and maximize the usefulness of government information.

- The availability of government information in diverse media, including electronic formats, permits agencies and the public greater flexibility in using the information. [Ref. 27, p. 5]

The Circular also indicates that agencies should utilize all avenues available to disseminate information. "Take advantage of all dissemination channels, Federal and nonfederal, including State and local governments, libraries and private sector entities, in discharging agency information dissemination responsibilities." [Ref. 27, p. 9] A method of dissemination that has become increasingly relied upon by all sectors of society is that of electronic dissemination. Circular A-130 addresses electronic dissemination in that "Agencies shall use electronic media and formats, including public networks, as appropriate and within budgetary constraints, in order to make government information more easily accessible and useful to the public." [Ref. 27, p. 10]

B. INITIATIVES

The National Information Infrastructure (NII) Agenda for Action is the plan that Vice President Al Gore will utilize in establishing "a seamless web of communications networks, computers, databases, and consumer electronics that will put vast amounts of information at users' fingertips." [Ref. 30, p. 4] Vice President Gore stated in a speech at the Federal-State-Local Telecomm Summit that

> A time comes in any revolution when expectations are very high but accomplishments are not yet concrete. It is at such a time that we must re-dedicate ourselves to the fundamental purpose of our efforts, measure how far we have come and how best to accomplish the revolutionary enterprise. That is the place we occupy today as we take stock of the efforts to develop the National Information Infrastructure and, more broadly, the Global Information Infrastructure. [Ref. 12]

This statement tells us that the battle for establishing a National Information Infrastructure is far from over but at least the issue is being addressed. The NII agenda for action echoed Vice President Gore in their statement that "we are committed to working with business, labor, academia, public interest groups, Congress, and state and local government to ensure the development of a national information infrastructure (NII) that enables all Americans to access information and communicate with each other using voice, data, image or video at anytime, anywhere." [Ref. 30, p.13] Although the NII is tied heavily to the current administration, the seeds that have been planted in the public and private sector regarding access to information and dissemination of information will help to pull the initiative along well after the administration has changed over.

One other initiative that has brought information dissemination and collection to the forefront of the public interest is the National Performance Review (NPR). In the NPR's report it was stated that "For some reasons--some regulatory, some legislative, some cultural--the federal government lacks appropriate access to the most efficient, cost effective information technology products and services. The government has lacked not only strong leadership in this area, but also a coherent plan on how to most effectively tap information technology's potential." [Ref. 32, p. 1] It is well known that the government

has found it difficult to provide quick responses to requests for information. "For practically everyone, dealing with the government is complicated. Americans complain that government is too slow or confusing in delivering its services or that they have too many places to call or go." [Ref. 32, p. 2] The NPR does recognize the problems and has suggested an answer of how to catch up. "Information technology, with its ability to electronically store and rapidly sort, transmit, and access information, is the key to solving this problem. If Mastercard can resolve a credit card issue at 1 a.m. and Federal Express can find the location of a package anywhere in the world, then, theoretically at least, government can do as well." [Ref. 32, p. 2] The NPR also speaks of support mechanisms for an electronic government. "Recent federal initiatives improving access to government information in electronic form --e.g. Office of Management and Budget (OMB) Circular A-130 and the Government Printing Office Electronic Information Access Enhancement Act of 1993 -- will accelerate the need for electronic connections to the outside world for most agencies and Congress. A wide variety of access methods will need to be supported, including connection to publicly available communications networks, such as Internet, Prodigy, and CompuServe, as well as dial-up access to the government-sponsored bulletin boards." [Ref. 32, p. 53]

C. EXAMPLES OF USE OF CHANGING TECHNOLOGY

The U.S. Department of Commerce is one of many agencies in the Federal government that has jumped on the electronic information distribution bandwagon. The initiative that they have undertaken has created a computer bulletin board that facilitates the dissemination of information from all parts of the federal government. "The U.S. Department of Commerce has established the mother of all computer boards [FedWorld] - an electronic octopus offer access to data, software and people at more than 50 federal agencies. These include the Library of Congress, the Government Printing Office, the Internal Revenue Service, the National Science Foundation, the National Institute of Standards and Technology (NIST) and the U.S. departments of Defense, Agriculture, Justice, Labor, Treasury, Energy, and Commerce." [Ref. 33] As a central point of access

to these many agencies, the Department of Commerce has simplified the information searching task for the public. In the past, the technology required to drive such a system would be a mainframe computer. Now, with the advent of the PC and its microprocessor the tasks that required a mainframe can now be easily supported by a PC. "At the heart of FedWorld is an Intel Corp. I486 PC running at 50 MHz with four multiplexers attached. Software is a standard, off-the-shelf bulletin board package," said Thomas Walker, FedWorld project director. [Ref. 33] Also, in working with a PC and standard software vice a Mainframe or larger computer, the costs of operating the system are lower. "It's obvious gateways exist; we wanted to do it at a reasonable cost, he said, adding that the gateway was set up in 78 days for less than $20,000." [Ref. 33] The Department of Commerce has given us an efficient and effective example to follow for setting up an electronic information dissemination. Walker said that FedWorld was set up in part to satisfy a mandate from Congress to demonstrate the feasibility of a public gateway to government data [Ref. 33].

Another example of the effect technology is having on the distribution of information is the Electronic Bulletin Board (EBB) set up by the General Services Administration. While the EBB is not available to the public it does create a much more efficient exchange of information between GSA and agencies of the Federal Government. This efficient exchange indirectly benefits the public by lowering the cost of GSA's procurement process, thus reducing the amount of tax dollars outlayed. The new service will post data on an APR [Agency Procurement Request] immediately after an agency submits the request to GSA and will continually update GSA's action on that request. Getting the information on APRs out quickly to the agency contracting officers helps in expediting the "filter down" process of disseminating information to all who are involved with or need to know about a particular project status [Ref. 34].

A third example of information technology in action is the WWW homepage put together by the White House. (See Figure 16). This homepage is fully accessible by the public (those with Internet access and a WWW browser) and provides some interesting

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information. Messages from both the President and Vice-President can be heard if your WWW browser has "helper applications" that support audio files. Also, you can leave a message in the White House guest book or look up information on the Executive Branch of the Federal Government. Those users who are interested in publications may view them on-line or may download them for their own reference. While there are many WWW homepages, the White House Homepage acts as a catalyst to the many Federal and State agencies to expedite their programs of information availability and dissemination.

In this chapter we discussed the laws that are having a direct effect on the requirements for dissemination of information. We also looked at some of the more important initiatives that are being pursued to increase the public awareness of information accessibility. Finally, we discussed examples of information technology that are having a profound impact on the way information is displayed and disseminated; from Electronic Bulletin Boards to WWW homepages. The next chapter will present lessons learned from the thesis research and construction of a prototype homepage and provide conclusions and recommendations for DoD agencies wishing to improve their information dissemination capabilities.

Welcome to the White House

Executive Branch

The First Family

Tours

What's New

Publications

Comments

An Interactive Citizens' Handbook

President's Welcome Message

Guest Book

Vice President's Welcome Message

Choose this for a textual representation of this page.

feedback@www.whitehouse.gov

Figure 16 Whitehouse Homepage

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

This thesis has provided an overview of the Internet and how its continuing growth makes it possible to share information with millions of people throughout the world. Three main Internet resources which help facilitate the sharing of information were discussed.

BBS's can be established and maintained easily and at a low cost. They facilitate the distribution of information by being available 24 hours a day, 7 days a week. BBS's are easy to use, and customers may browse or download files which they find of interest. Customers are not required to have a lot of equipment to access this tool, only communication software and a modem.

Gopher client/server systems require more technical knowledge to establish, but offer a more efficient method of presenting information to customers. Though information is stored physically on different systems, navigating from one system to another in order to gather information is invisible to the user. From user's perspective, the information they require appears to reside on one system. All of the software required to set-up and maintain is free and can be downloaded from the Internet. System managers have the flexibility to store, update, and delete any information they feel is relevant to their operations.

The World Wide Web (WWW) is at the cutting edge of information dissemination. By using web browsers like Mosaic and Netscape, users have access to all forms of information including text, images, sound and video. All of the services provided through the Internet can be accomplished easier via the WWW. Resources such as FTP, TELNET, WAIS and Gopher can be utilized, but with greater efficiency and ease. The graphical user interface (GUI) makes it easy for any user to access information on any site, in any form. The user simply has to "point and click" to the information he or she wants, and the software knows what format is required to retrieve the information.

To show the versatility and possibilities of the WWW, this thesis showed how a working WWW homepage prototype was constructed for the DBMU. The DBMU faces a typical problem as do other DoD agencies today: shrinking resources, with added commitments, make it imperative to find the most efficient way of doing business. This means DBMU cannot rely on standard practices such as distributing information on paper to a large workforce spread worldwide. The DBMU was used as a case study to learn if Internet resources could be utilized in order to reengineer the way DoD disseminates information.

Lessons learned were presented to help other DoD agencies thinking about developing a homepage not make some of the mistakes we did. Although there were many compatibility problems dealing with different versions of software used in creating the code, the benefits are well worth the effort. Also outlined were steps which should ease the whole process of developing a homepage.

A major concern whenever developing something new is whether the people it is intended for can actually use it. The main objective of the survey in this thesis was to find out the answer to that specific question. We wanted to be sure that DBMU's customers had the technical capabilities to access information on the Internet. This thesis described the steps taken in developing a survey design that would give the best possible representation of the capabilities of DBMU's customers. Based on the descriptive analysis, we feel that using the Internet to distribute information is a viable option for the DBMU. Although not all customers have Internet access, the majority do through the DDN. We believe that, eventually, those in the minority will become connected as well.

Finally, this thesis concluded by discussing legislation that is changing the way government does business. There are examples of government offices opening their information to the public via BBSs or through resources on the Internet. We believe this is only the beginning, and with the new legislation that is passing, more and more offices will be distributing information via the Internet. A few examples of government agencies making the change were presented along with their reasons for doing so. This chapter

was used as the final chapter to help lay the foundation for some of our recommendations. We believe that the groundwork is already in place for DoD offices wishing to redesign their information distribution methods.

B. RECOMMENDATIONS

Our first recommendation for those wishing to change their information distribution practices is to know what the customers' capabilities are. Along with this first recommendation is to include the customer in the change process by explaining how the new method of distributing information will help them in their work. This makes them feel like they have a stake in the new system. This will also motivate the customer to learn how to use the new system. In the case of the DBMU, customers responded favorably to having information disseminated electronically because they recognized the benefit in receiving up-to-date information.

The next point to mention is that no matter how good a system performs, having only one method for distributing information is insufficient. Sharon Fratis, a Curriculum Improvement Specialist with the DBMU, stated that while the homepage was a good idea, there would always be customers who were either not connected to the Internet or were connected but did not use it [Ref. 39]. She believes, and we agree, that only through a combination of dissemination methods will everyone be guaranteed of receiving the information. Based on this belief, we feel that the DBMU should continue to use their electronic bulletin board system and provide catalogues in disk format until such time as all their customers can access their WWW homepage.

Another consideration is making sure customers have the knowledge to access the medium through which information is distributed. In the case of the DBMU, many customers responded that they were connected to the DDN, but were not connected to the Internet. This was surprising because the DDN provides non-secure connection to the Internet. Clearly these customers do not understand what capabilities they possess by being connected to the DDN. The DBMU will have to provide information on how these customers can access their homepage via the DDN. Since technology is changing rapidly,

DBMU and other DoD agencies wishing to change the way they distribute information will have to provide some training to its customers prior to fully switching over to a new information dissemination method.

One of the main benefits of distributing information via the Internet is the large number of people an organization can reach. Frank Stone, Director for Curriculum Improvement for the DBMU, and Steve Crane, Senior Budget Analyst at the DBMU, both feel that the homepage will allow more of their customers to know who they are and what services they provide [Ref. 39]. In addition more people can access DBMU's information directly vice having to wait for the information to filter down through supervisors.

Along with the benefits of distributing information on the Internet come some important considerations such as security, system administration, storage of information, hardware, software, and communication resources.

By allowing a system to store information which can be accessed by customers via the Internet or through an electronic bulletin board, an organization opens itself up to outsiders. Normally, this should not be a problem. However, there are individuals who find it challenging to crack into other areas of a computer system not meant to be opened to the public. These "hackers" can simply be curious, or they can be malicious by moving, corrupting or installing viruses into files. To combat this, never place classified information on a system which is used to store public information. This is the only way of being absolutely sure that information meant to be classified remains that way. Second, having established policies such as regular system back-up and using virus scanning software prior to establishing an Internet connection to your files should prevent any major problems from occurring.

The idea of managing your own server or outsourcing the task of putting your information on-line is another consideration. There is an initial big investment of time setting up a server and placing the information in the right format so that customers can access it. The benefit of doing this is having quick access to the information in case

updates are needed. While it is true that an organization can send the new information to the file server managing the data, this takes time and reduces the flexibility of establishing a server yourself. The benefits of outsourcing are no upfront costs such as buying extra hardware to set-up the server on, and the protection by keeping people out of your system by storing information files on another system. In the case of the DBMU, the files are already formatted and the resources exist to establish there own web server. For agencies which have no technical support, we recommend outsourcing until a level of experience operating a gopher or web server is reached.

The format in which an organization stores its information will determine the amount of storage capacity that is needed. For text files only, the amount of storage needed might be minimal. However, if information is stored in video, image, or sound, the amount required to store such data is quite high. An additional item to remember is that as organizations migrate to graphical versus text-based information, more hardware and software is required by customers to access the information. In creating the DBMU homepage, we used mainly text files and kept graphics to a minimum in order to save space and to increase the speed at which customers receive the information. Large graphics can take a few minutes to come up on a monitor when someone is using a 9600 baud modem to access the information.

No special hardware is needed to establish a server. A 386 or 486 microprocessor can handle the job quite easily. If the information stored on the server is extensive, it would be better to dedicate the machine to being a server rather than trying to divide the resource among various jobs. All client and server software for WWW and gopher systems is freeware or shareware. Although there are no guarantees that these products will work, they have been around for awhile and have proven to be quite reliable.

Finally, the use of communication resources must be considered. The type of connection an organization has to the Internet will determine how fast information can be accessed. Communication lines with larger bandwidths will allow data to move quickly, and can handle large files which contain video, sound or graphics. However, information

can move only as fast as the customer's connection will allow. In addition, the cost increases dramatically as the bandwidth increases. We do recommend, however, that a dedicated line be used if an organization establishes its own server.

The technology presented in this thesis is by no means the solution to every information dissemination problem in the DoD, but can improve and replace many of the paper-based legacy systems that are in place today. With the shrinking budget and dwindling resources, every DoD agency must look at its information distribution practices and decide whether the old way of doing business is the best way of doing business.

APPENDIX A. DBMU HOMEPAGE AND CODE

Defense Business Management University

"Committed to building an integrated, competency-based education and training system to meet the future professional development needs of our workforce." --John Raines, President, DBMU

Welcome to our On-line Information System

- **Mission of DBMU**

- **Message from the President of DBMU**

- **DBMU Organization**

- **Catalog of Courses**

- **Catalog Software**

- **Quarterly Newsletter**

Other Interesting Information:

Related Information Links

For comments or suggestions please contact:
sfhurst@nps.navy.mil
Steve Hurst DBMU - Homepage Manager

Related Information Resources

FINANCENET -- A Link of Gov't Finance professionals

ASMC Membership News

Defense Resources Management Institute Homepage

Defense Acquisition University Homepage

Distance Learning Information

Office of the Secretary of Defense -- An excellent variety of information links

Stanford University --A compendium of WWW home pages

Harvard University --Reference Desk

Weather--Up to date satelite weather map

What's New on the Internet -- A daily list of new servers

RETURN TO MAIN PAGE

For comments or suggestions please contact:
sfhurst@nps.navy.mil
Steve Hurst DBMU - Homepage Manager

DBMU Homepage File Structure
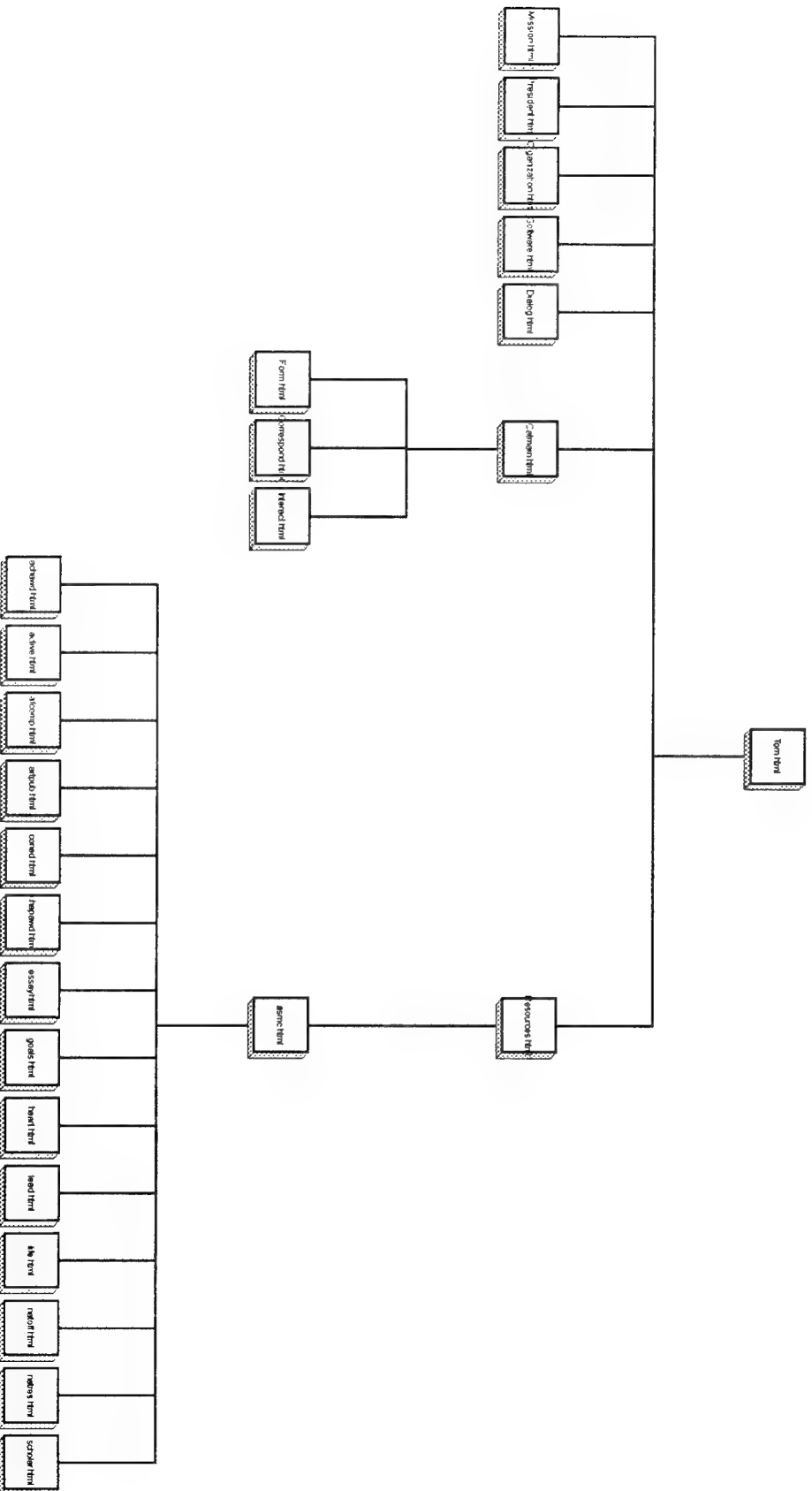
File: tom.html -- This file is the Homepage which points to all other files.


```
<html> <head> <Title>The DBMU Homepage of the World</title> </head>
<iMG ALIGN=middle SRC="dod.gif"></a>
<body>
<H1> <p>Defense Business Management University</h1> </hr> <EM>"Committed to
building an integrated, competency-based education and training system to meet the future
professional development needs of our workforce." --John Raines, President,
DBMU</EM><p>
<iMG ALIGN=top SRC="bluebar.gif">
</a> <h1>Welcome to our<s> On-line</s> Information System<hr></h1>
</p> <h3> <ul><A HREF="mission.html"><img align=bottom src="pball.gif"> Mission of
DBMU</a></h3> </p>
<h3> <A HREF="president.html"><img align=bottom src="pball.gif"> Message from the
President of DBMU</a></h3></p> <h3><A href="organization.html"><img
align=bottom src="pball.gif"> DBMU Organization</a></h3></p> <h3> <A
HREF="/DBMU/catalog/catmain.html"><img align=bottom src="pball.gif"> Catalog of
Courses</a></h3>
<h3> <A HREF="software.html"><img align=bottom src="pball.gif"> Catalog
Software</a></h3>
<h3> <A HREF="dialog.html"><img align=bottom src="pball.gif"> Quarterly
Newsletter</a></h3> </ul>
<h2><hr>Other Interesting Information:<p></h2> <a href="resources.html">Related
Information Links</a><p>
</HR>
 <h3>For comments or suggestions please contact:
<address>sfhurst@nps.navy.mil</address> Steve Hurst DBMU - Homepage
Manager</h3>
</html>
```

File: mission.html

```
<html>
<h1><u> The Mission Statement of DBMU</u></h1> <img align = middle
src="bluebar.gif"></a>
<h3>The Defense Business Management University was established on December 12,
1992 with the mission to forge agreement on the fundamental education and training needs
of the DoD Financial Management professional and then to develop and deliver the
required curricula and courses to train the workforce.</p>
The choice of the word <strong>"business" </strong>in the University title is a deliberate
decision. It is used to imply the expanded role of financial managers in the dynamic
environment of DoD. To be effective today, financial management personnel must
broaden their perspective and thinking in terms of business concepts and principles. This
evolution in thinking is consistent with recent trends in the private sector and explains the
re-orientation towards a broader business management perspective in the support
establishment. DBMU will ensure that the education and training necessary to achieve this
vision is provided.</p>
DBMU represents a critical component of the DoD strategy to implement improved
business management practices. The University will facilitate these improvements by
providing education and training necessary to support new organizational structures and
business systems throughout the Department. The Financial Management Education and
Training Catalog is one tool which will help the workforce become better prepared as
business/financial managers.</h3> <img align = middle src="bluebar.gif"></a><p> <A
HREF="tom.html"><IMG ALIGN=bottom SRC="left.gif"> RETURN TO MAIN
PAGE</a> </HR> <address>sfhurst@nps.navy.mil</address>
</html>
```

File: president.html

```
<html> <Title> Message From the President</title>
<h1> Message from the President</h1> <img align = middle src="bluebar.gif"></a>
<h2>Under the direction of the Comptroller of the Department of Defense, improving
financial management education and training (FMET) has become a DoD wide-priority. I
am pleased to present the "on-line" Financial Management Education and Training
Catalog. It will help members of the DoD financial management community plan their
education and training wisely and more efficiently.<p><p>
 In order to better serve your professional development needs in the future, I would
welcome any comments or suggestions that you may have concerning the "on-line"
catalog.<p><p></h2>
<pre>                        John Raines President Defense Business Management
University</pre><p>
<img align = middle src="bluebar.gif"></a><p> <h2><A HREF="tom.html"><IMG
ALIGN=bottom SRC="left.gif">  RETURN TO MAIN PAGE</a></h2> </HR>
<address>sfhurst@nps.navy.mil</address>
 </html>
```

File: organization.html

```
<html> <title>DBMU Organization</title> <p><h1> DBMU Organization</h1>
 <img align = middle src="bluebar.gif"></a><p> <img align = middle
src="org.gif"></a><p>
<h2><em>Defense Business Management University</em></h2><p>
<img align = middle src="bluebar.gif"></a><p> <A HREF="tom.html"><IMG
ALIGN=bottom SRC="left.gif">  RETURN TO MAIN PAGE</a></h2> </HR>
<address>sfhurst@nps.navy.mil</address>
</html>
```

File: catmain.html

```html
<html> <title> Catalog of Courses</title> <h1>Catalog of Courses</h1> <hr> <a href
="/DBMU/catalog/formal/form.html">Formal Courses</a><p>
<a href ="/DBMU/catalog/correspond/correspond.html">Correspondence
Courses</a><p>
<a href = "/DBMU/catalog/interact/interact.html">Interactive Courses</a><p>
<hr> <a href = "/DBMU/tom.html">Return to Main Menu</a> <hr>
<address>sfhurst@nps.navy.mil</address> </html>
```

File: software.html

<html> <title>FMCAT 94 Software</title> <h1>Financial Management Catalog Software</h1> <hr> <p> <h2>To Download the Financial Management Catalog please do the following:<p>
1. Under the "Options" part of the Mosaic menu select "Load to Local Disk" (or "File/Save Next Link as" under Netscape),<p> 2. Once you have done that click on the highlighted text below.<p><p>

<h1>DOWNLOAD THE SOFTWARE</h1><p>
3. After receiving the software, move to the directory where you downloaded the program. Type "fmcat_94.exe -d" . The file is compacted and will decompress when executed in the directory where it is located.<p>
4. Once unpacked/decompressed, the catalog software may be run by typing "fmcat94.exe" at the command prompt (ensuring you are in directory where the file is located). Windows users can use File Manager to run the program.<p><h2>
<img align = middle src="bluebar.gif"><p> <A HREF="tom.html"><IMG ALIGN=bottom SRC="left.gif"> RETURN TO MAIN PAGE </HR>
<address>tmmcgrat@nps.navy.mil</address>
</html>

File: dialog.html

<html> <title> The DBMU Quarterly Newsletter<p></title> <body>
<h1><img align=top src="logo.gif">The DBMU Quarterly Newsletter</h1><p>A
publication of the Defense Business Management University<p><h2><tt>September
1994</tt></h2><p> <img align=top src="bluebar.gif">   <pre><h2> PROFESSIONAL
BUSINESS MANAGEMENT COURSE - BASIC,   FIRST VALIDATED DOD
COMPTROLLERSHIP COURSE</h2>
<h3>COL Timothy T. Timmons and his staff at Sheppard Air Force Base provided
outstanding support as the hosts for this event. Students from various DoD
Services/Agencies at the GS 5-8, E5-E7, WO, and O1-O3 levels were the target audience.
Instruction came from subject matter experts who were involved in the total
developmental process. The validation was very successful with all participants (students,
subject matter experts, and course developers) agreeing it met the goal of introducing
entry level students to the core competencies of Comptrollership.</h3>
    <h2>PROFESSIONAL BUSINESS MANAGEMENT COURSE BASIC
(PBMC-B)</h2> <h3>The PBMC-B was jointly developed under the direction of the
Comptrollership Standing Committee, the Defense Business Management University,
subject matter experts and professional course developers from the Army, Air Force,
Navy, Army Management Engineering College, Defense Finance and Accounting Service,
Defense Business Management University, Defense Logistics Agency, and DoD
Comptroller s Office. The Resource Management Department, Army Finance School, was
the "Lead" institution for PBMC-B development. This course concentrates on introducing
DoD entry level business management personnel to the world of Comptrollership. Subject
areas covered during blocks of instruction are tailored to relate directly to core
competencies. These subject areas address the fundamental aspects of the topics listed
below: DoD Organization and Flow   Role of the Comptroller Workforce
Structure   Planning, Programming & Budgeting Fiscal Controls
                    Budget Audit   Accounting
Ethics   Customer Service Unit Cost
                Defense Business Operations Fund   Support Agreements
            Career Development Cost Analysis
Performance Measures Business Improvements   Economic Analysis
Internal Management Control   Commitments, Obligations, Expenditures
                            and Reimbursements
The Army has been designated as Executive Agent for PBMC-B and will be offering
regularly scheduled courses in the near future.</h3>
    <h2> UNIT COST RESOURCING BROCHURE</h2>
<h3>A new Unit Cost Resourcing Brochure has been developed to explain the:
        Who   Why   ?   What   When
                ?   Where

of Unit Cost as a management tool. The brochure answers the most frequently asked questions about Unit Cost and describes the benefits of managing according to Unit Cost principles. The brochure is a companion to the Executive Level Unit Cost Handbook, which is now under development and due to be distributed to the workforce later this year. Both the handbook and brochure are being distributed through the DoD Components, DBOF Corporate Board members, DoD schools and the DBMU newsletter mailing list.</h3>

<h2> DBMU TRAINING ASSISTANCE TO DFAS</h2>

<h3>At the direction of the DoD Comptroller, DBMU has been working with DFAS to obtain training for the Agency. This project is expected to take place over several years and is currently being accomplished in phases. A Memorandum of Understanding has been signed and work is proceeding for the DFAS-Kansas City. The initial phase involves acquiring training for six functions and approximately 15 systems. Functions targeted for development are travel, vendor pay, military pay, disbursing, general accounting, and DBOF accounting.
DBMU and DFAS-KC have developed Statements of Work for each function and identified contractors who are currently reviewing the requirements. Once a contract is issued, the vendor will be developing and delivering the training. Delivery will be accomplished at the DFAS-KC training facility located off site. Each classroom at this facility contains personal computers and will be used for systems training.
DBMU is getting ready to begin work in support of the other four centers soon.</h3>

<h2> FINANCIAL MANAGEMENT EDUCATION AND TRAINING CATALOG VIA THE DBMU INFORMATION SYSTEM </h2>

<h3>Use your modem to download the FMET catalog by calling 408/656-3756 or DSN 878-3756. If you need further assistance call Mr. Steve Hurst at 408/656-3171 or DSN 878-3480. He can fax you specific instructions and/or answer any questions.</h3>

<h2> NOTES FROM THE STANDING COMMITTEES </h2>

<h3>The Standing Committees are functionally oriented (Comptrollership, Finance & Accounting, Budget, and Analysis) and are composed of subject matter experts representing all military services/agencies.</h3>

<h2> COMPTROLLERSHIP</h2>

<h3>The Professional Business Management Course - Intermediate is currently under development with the Navy as lead institution, with the Military Services and DoD Agencies providing subject matter experts and professional course developers. The Pilot for this course is scheduled for 3rd Quarter FY95. The Professional Business Management Course - Executive is in the conceptualization stage with the Air Force as the lead institution. The same development philosophy used for the PBMC-Basic will be applied. Also, the Standing Committee is reviewing alternative training/education means of delivery; i.e., satellite, computer assisted, etc. Throughout this process the DBMU is stressing continued quality control and joint participation by staffing products through the Standing Committee and subject matter experts at OSD.</h3>

<h2> ANALYSIS</h2>

<h3>The Analysis Standing Committee has set an ambitious course of action!! A set of core courses is being developed and requires further Coordinating Board review:

1) to deal with all the needs of the whole business management community

2) to respond to specific "how to" needs of business management personnel regardless of classification.

To establish a solid foundation in analysis, the outlook is very bright! Being developed are two modules for the Professional Business Management Courses (Basic and Intermediate) that help the student understand how analysis is a requirement in the cross-disciplinary profession of comptrollership.

Basic Analytical Decision Making, Fall 1994   Intuitive Approaches to Analysis, Spring 1995

A Preparatory Analytical Toolkit (PAT), which emphasizes basic algebra, basic statistics, spreadsheet and relational data base applications in Business Management (1995, 2 weeks long)

Defense Resources Management Course (Professional Business Management Analysis) which emphasizes managerial decision making for resource allocation issues (Jan 1995, 4 weeks long)

Art and Science of Organizational Analytical Decision Making which emphasizes supporting the professional doing his/her technical work by ensuring a positive working environment (Jan 1996, 4 weeks long)

Those two modules and three courses are designed from a building block approach and set the stage for specialized training. They are considered essential prior to taking specialized training. However, one will be able to spring board into specialized training after demonstrating PAT level competency. It is possible to determine through diagnostics and/or equivalency whether one already possesses these competencies and/or is prepared to take these courses. Over a two year period (1995-1996), hands-on, "how to" courses delivered through platform and/or interactive distance learning are being pursued. Based on a consensus-based task analysis, current topic areas identified are:

1. Planning Analysis<p>   2. Business Process Improvement/Business Process Reengineering/Benchmarking<p>   3. Decision Support System<p>   4. Quality Initiative Analysis Techniques<p>   5. Manpower Analysis<p>   6. Non-Weapons System Cost Analysis<p>   7. Force Costing<p>   8. Program/Budget Analysis (developed by Budget Standing Committee)<p>   9. Economic Analysis<p>   10. Functional Economic Analysis<p>   11. Activity Based Costing<p>   12. Financial Analysis<p>

By the end of the course, the learner (to include OJT through job aids) will be competent in performing the task in his/her assignment. This means of specialized training is intended to meet the needs of business management personnel performing a specific job task, e.g., economic analysis.

Another area of specialized training, cost analysis for acquisition, is being spearheaded by the ASC for the Defense Acquisition University (DAU) and jointly sponsored by The Defense Business Management University. Six of the cost analysis courses were piloted in

FY 94 and two will be piloted in FY95.</h3>   <h2> FINANCE & ACCOUNTING</h2>

<h3>The Finance and Accounting Standing Committee is developing approximately 12 core courses. The following are expected to be completed by 3rd quarter 1995.
    Military Pay Course   Civilian Pay Course   Technician Training Guides</h3>
    <h2> BUDGET</h2>

<h3>The Budgeting for Better Business Management course development team has been hard at work during the months of July and August.

The team said a fond farewell to Wes McNair, initial chairperson of the DBMU Budget Standing Committee (BSC), who is moving on to new responsibilities. On behalf of all of those involved with the Committee s efforts, we wish to thank Wes for his leadership, insight and thoughtful contribution during the needs assessment and team development stages of this ambitious project. Daniel Brandeburg of the NAVCOMPT Office of Budget and Reports, has assumed chairmanship of the BSC and was present at the recent Task Analysis Workshop. Facilitated by Shirley Tweedell of Information Mapping and Clark Consulting, the team underwent intensive training in the Instructional System Design (ISD) approach to curriculum development and the associated techniques of Information Mapping.

Armed with these important tools and preliminary data from the Air Force Occupational Measurement Squadron at Randolph AFB, Texas, the team met to conduct a comprehensive task analysis and course outline. This completed, the team adjourned to begin writing terminal and enabling learning objectives for the individual modules of instruction.

The team plans to have completed lesson plans by February 1995 and pilot the course shortly thereafter. A complete course documentation will be presented to the BSC for review and approval in December, 1994.</h3>

    <h2> REENGINEERING GOVERNMENT</h2>

<h3>Many of you have been hearing the term, "reengineer government", a lot these days. If you re like many others, you re probably wondering what's the difference between "reengineering" and "total quality management" (TQM). Are these just two different names for the same thing? Is "reengineering" just the latest management fad or is it part of President Clinton's call to us to help make our government work better and cost less?

There are several important differences between reengineering and TQM. Under the TQM philosophy, business processes are fixed through a continuous process improvement program. Under reengineering, there is no fix--it is radical redesign, throw out the entire process and start from the beginning and design a new one-- if it s needed!

Another important difference is the role of people. Under TQM, there is a focus on changing the organizational culture. In other words, change the behavior of the people in the organization. Under reengineering, the focus is on allowing the creative, innovative, American ingenuity of employees to redesign the business processes to meet the needs as they are appearing right now. In other words, don t focus on changing their behavior, rather; empower them to do whatever needs to be done so the organization can thrive.

Currently, reengineering is very popular. A large percentage of companies, both in the US and Europe are using the reengineering process, and many more are thinking about it. We in the federal sector are also looking at reengineering and trying to figure out how we can apply it. All agree that reengineering is a disruptive process because of its basic concept of radical redesign of business processes, rather than a continuous (and slower) fix of business processes. We are examining how we can best use the reengineering tools to improve our processes within larger systems to get results with minimum disruption to the organizations.

Like other recent management improvement initiatives, lessons learned from reengineering initiatives indicate organizations are still dealing with old problems when it comes to making changes. Fear of loosing jobs is a big one because reengineering looks to streamline processes which often result in leaner organizations. Employees in areas undergoing reengineering often try to protect their jobs rather than design more productive processes.

Also, reengineering requires total buy-in and support of senior management. Without that, reengineering projects fail. When that happens, organizations put themselves through a lot of stress, with little or no improvement. Employees become discouraged because it appears to be business as usual.

Reengineering, like other initiatives, needs to be linked to strategy. Why realize efficiencies in a product or service if that product or service is no longer in demand? When an organization does strategic planning, they may decide reengineering can assist them in realizing their vision and goals. Reengineering then becomes a tool that can help an organization achieve success.</h3>

<h2> RELEASING GROUP POTENTIAL</h2>
<h3>Lois Elkin and LaDell McFarlen

Is facilitation magic? No, but it sometimes seems that way. A professional facilitator can work with a group of individuals and help them break down barriers, value their differences, discover common goals, and transform themselves into a high performing team. As organizations seek to find new and improved ways to work in response to the heavy demands and sea of changes being experienced by us all, more organizations are discovering the application of facilitator skills to improve meetings and create a working environment of collaboration, trust, and shared responsibility for outcomes. Which brings us to the subject of a new book, Releasing Group Potential. A member of the DBMU staff, Lois Elkin, recently co-authored this book, which describes everything one needs to know about facilitating groups to break down interpersonal barriers and bring organizations to higher levels of performance. The book stretches the existing state-of-the-art by incorporating electronic meeting systems and enhanced environment (accelerated learning) techniques and methods in working with groups to realize their full potential. True, and sometimes humorous, stories from the authors experiences are interspersed in the chapters. While the book's primary audience are those individuals desiring to become professional facilitators, or facilitators seeking to enhance their skills, the book is written in a user friendly format designed to help improve people and

communication skills for anyone interested in personal growth. The book is organized into four sections:</h3>
 <h2>THE BASICS</h2>
<h3>These chapters answer such questions as:
    What is facilitation?   What is the role of a facilitator?   How does one become a facilitator?</h3>
<h2>ANATOMY OF A SESSION</h2>
<h3>These chapters answer the question, "How does one plan, prepare and conduct a session?"</h3>
<h2>ADDING PEOPLE TO THE FORMULA</h2>
<h3>These chapters provide tips and special techniques for helping the facilitator respond to the unique requirements of a facilitated session.</h3>
<h2>BEYOND THE BASICS</h2>
<h3>These chapters deal with special topics for the expert facilitator such as applying facilitation to business processes, electronic meeting systems, and enhancing creativity through the environment.
Plans are to make the book available to the general DoD audience through DBMU distribution channels. A notice will be published in a future DBMU newsletter with instructions on how to order.</h3></pre> <hr> <h2><A HREF="tom.html"><IMG ALIGN=bottom SRC="left.gif"> RETURN TO MAIN PAGE</h2> </HR>
<address>sfhurst@nps.navy.mil</address>
</html>

File: resources.html

<html> <title>Interesting Resources</title> <Body> <h2>Related Information
Resources</h2><p> <hr>
<A HREF="http://www.financenet.gov/"><img src="pball.gif"> FINANCENET -- A
Link of Gov't Finance professionals <p>
<A HREF="/DBMU/asmc/asmc.html"><img src="pball.gif"> ASMC Membership
News
<p> <A HREF="/DBMU/DRMI/home.html"><img src="pball.gif"> Defense Resources
Management Institute Homepage
<p> <A HREF="http://www.acq.osd.mil/dau/dau.html"><img src="pball.gif> Defense
Acquisition University Homepage<p> <A HREF="distance.html"><img
src="pball.gif> Distance Learning Information<p>
<p> <A HREF="http://enterprise.osd.mil/"><img src="pball.gif"> Office of the Secretary
of Defense -- An excellent variety of information links
<p>
<img src="pball.gif"> Stanford
University--A compendium of WWW home pages
<p> <img src="pball.gif"> Harvard
University--Reference Desk <p> <a
href="http://www.atmos.uiuc.edu/wxworld/html/top.html"><img src="pball.gif">
Weather--Up to date satelite weather map
<p> <A
HREF="http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/Docs/whats-new.html"><img
src="pball.gif"> What's New on the Internet   -- A daily list of new servers<p></h3>
<hr> <A HREF="tom.html"><IMG ALIGN=bottom SRC="left.gif"> RETURN TO
MAIN PAGE </Body> <hr> <h3>For comments or suggestions please contact:
<address>sfhurst@nps.navy.mil</address> Steve Hurst DBMU - Homepage
Manager</h3> </html>

File: asmc.html

```
<html> <title>The American Society of Military Comptrollers</title>
<h1>The American Society Of Military Comptrollers</h1><p>
 <iMG ALIGN=middle SRC="asmchead.gif"></a><p> <hr><pre> Dear Member,    It is
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our pleasure to provide the first copy of the "Membership News," a new publication for
ASMC. In the past, in addition to the Armed Forces Comptroller, members received just
one communication each year from the National Headquarters: a membership renewal.
This year members first received a membership renewal and database update, and now this
second communication which gives you information about ASMC, with your membership
card attached. We hope that this two-stage approach will serve you better.

   ASMC has embarked on an ambitious project: a membership drive in the face of
turbulence and down-sizing. We believe that this is an important time to provide the
benefits of membership to a wider audience. Under our special "Membership Bounce,"
each chapter can earn a bonus rebate by raising membership at least 25%. Our members
are our recruiters. If each member brings a new member into the society, overall success
is guaranteed.

   In the pages of this newsletter we have outlined the essence of ASMC programs and
benefits. Please take the time to read and digest the information. If you have any
questions or suggestions, discuss them at chapter level and give us a call. Best of luck for
a great membership year.

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Sincerely, <em>James F. McCall</em> LTG U.S. Army (Ret.) Executive Director</pre>
<hr> <a href ="goals.html"><img src="pball.gif">Goals</a><p> <a href="life.html"><img
src="pball.gif">Life Membership</a><p> <a href="lead.html"><img
src="pball.gif">Leadership Opportunities in ASMC</a><p> <a
href="chapawd.html"><img src="pball.gif">Chapter Competition and Awards</a><p> <a
href="active.html"><img src="pball.gif">Chapter Activities</a><p> <a
href="achawd.html"><img src="pball.gif">Team and Individual Achievement
Awards</a><p> <a href="essay.html"><img src="pball.gif">Essay Contest</a><p> <a
href="coned.html"><img src="pball.gif">Members' Continuing Education
Program</a><p> <a href="scholar.html"><img src="pball.gif">Scholarship
Program</a><p> <a href="afcomp.html"><img src="pball.gif">Armed Forces
Comptroller</a><p> <a href="natres.html"><img src="pball.gif">National
Research</a><p> <a href="artpub.html"><img src="pball.gif">Articles for
Publication</a><p> <a href="heart.html"><img src="pball.gif">Discover the Heart of It
All in Columbus, Ohio -- PDI '95</a><p> <a href="natoff.html"><img
src="pball.gif">Your National Officers</a> <hr>
<h3><A HREF="http://sm.nps.navy.mil/DBMU/resources.html"><IMG ALIGN=bottom
SRC="left.gif">  RETURN TO MAIN PAGE</a></h3> </HR>
<address>sfhurst@nps.navy.mil</address>
 </html>
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File: achawd.html

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<html> <title>Achievement Awards</title> <body> <pre><h3>
                    <h2>Team and Individual                 Achievement Awards</h2>
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The awards program is central to ASMC. The Society places a high priority on insuring there is recognition for the excellent work ongoing in many fields of Comptrollership. In past years the judging was done by panels chaired by ASMC Vice Presidents. This year the Individual Awards in four (4) categories including Budget, Comptroller, Accounting & Finance, and Analysis & Evaluation will be judged by panels of subject matter experts from the Defense Business Management University (DBMU).

Also, this year we will provide a larger number of awards to those areas which receive a larger number of applicants such as Budget. Nomination forms and further information appear in the Fall 1994 issue of the Armed Forces Comptroller. In addition, in 1995, ASMC will recognize outstanding interns/trainees with a new category to the individual awards program.

Beginning with the PDI in Kansas City ASMC recognized Team Achievement. These awards were well received and hotly contested by the membership. We will continue to present team awards in Columbus, Ohio, In addition to the National Award Program, many Chapters have a complete individual awards program. Contact your local chapter for more information.

Keep up the good work. </h3><pre> </body> <hr><h3> <img src="left.gif">Return to ASMC Homepage</h3> <hr>
<address>sfhurst@nps.navy.mil</address> </html>

87

File: **active.html**

<html> <title>Chapter Activities</title> <body> <pre><h2>   Chapter Activities</h2>
 <h3>   What is the primary activity of your Chapter? Luncheons with speakers, annual
training days, mini-PDIs, social activities, or all of the above? Properly channeled, high
quality activities are the secret to Chapter success. A few point, albeit obvious ones are:
     a. Plan ahead - start early   b. Obtain command support
     c. Select "dedicated" volunteers
     d. Involve corporate members
     e. Establish attainable goals and objectives
     f. Remain flexible - changes will come   g. Stay focused on the goals
     h. Pay attention to details
     i. Participate in the activity
     j. Reward hard work
Chapter activities are the core of our organization. Make them great! </h3></pre>
</body> <hr><h3> <img src="left.gif">Return to ASMC
Homepage</h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>

File: afcomp.html

<html> <title>Armed Forces Comptroller</title> <body> <pre><h2>
Armed Forces Comptroller</h2>
<h3>   The Armed Forces Comptroller is our primary means of sharing professional information. Articles are received from a variety of sources, to include academia, government officials, and the membership at large. Members are encouraged to become authors. Challenge yourself and develop an article for publication. Even if it is not accepted, the preparation and the research will contribute to your professional development.

The Editorial Board of the Armed Forces Comptroller performs a difficult and frequently thankless task. They review each article professionally and impartially. Their comments are frequently provided directly to the author and contribute to improving editorial quality of the magazine and the perspective of the author. In 1995, look for the Editorial Board to provide the AFC with continued improvements in layout and design, increased usage of theme issues, and the appearance of more regular feature columns.

The National Headquarters is now assembling a complete library of the AFC from its inception. Should you have any issues from 1964-1969 please send them to us so that we may historically archive our professional journal.

We can all be proud of the Armed Forces Comptroller.</h3> </pre> </body>
<hr><h3> <img src="left.gif">Return to ASMC Homepage</h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>

File: artpub.html

<html> <title>Articles for Publication</title> <body> <pre><h2>
 Articles for Publication</h2>
<h3> Have you wanted to submit articles for publication in the Armed Forces
Comptroller? Although the articles must meet a high standard of literary excellence, that
is no reason to delay. We have printed a wide range of viewpoints on the many issues
facing the community. As a private organization we do not have to reflect the "party-line"
on any topic.
    Occasionally you may disagree with an article in the magazine, which may stimulate a
counterpoint article from you. If it is timely and constructive it will receive fair
consideration by the Editorial Board.
    Remember, as a published author you can reach an audience of over 18,000 including
schools and libraries. It is a great challenge, but with a great reward. All submissions
should be forwarded to ASMC National Headquarters, attn: Editor. </h3><pre> </body>
<hr><h3> <img src="left.gif">Return to ASMC
Homepage</h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>

90

File: coned.html

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<html> <title>Members' Continuing Education Program</title> <body> <pre><h2>
  Members' Continuing Education Program</h2>
<h3>    For the third year, the American Society of Military Comptrollers will be awarding
up to twenty-five (25) continuing education grants.  This successful program has assisted
our membership in financing its academic endeavors.  Nominees must be members of
ASMC, must be entering or in a field of study related to financial/resource management,
and must be endorsed by a local ASMC Chapter President.  Look in the Fall issue of the
Armed Forces Comptroller for more information and nomination forms.  </h3><pre>
</body> <hr><h3> <a href="asmc.html"><img src="left.gif">Return to ASMC
Homepage</a></h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>
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File: chapawd.html

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<html> <title>Chapter Competition and Awards</title> <body> <pre><h2>
    Chapter Competition and Awards</h2>
<h3>    Many Chapters are recognized during the annual PDI for outstanding programs.
```
Perhaps an overall competition trophy is out of reach for your Chapter, but there are many
other areas of competition. Your Chapter may excel in:
        a. Membership Growth
        b. Professional Development Programs
c. Community Service
        d. Newsletter
    Competition can add something special in the overall quality of chapter activities.
Become a competitive member in your Chapter and help bring home a prize. With your
support, they will succeed. More information on Chapter Competition is located in the
Chapter Handbook.pter, but there are many other areas of competition. Your Chapter
may excel in:
        a. Membership Growth

b. Professional Development Programs
        c. Community Service
        d. Newsletter
    Competition can add something special in the overall quality of chapter activities.
Become a competitive member in your Chapter and help bring home a prize. With your
support, they will succeed. More information on Chapter Competition is located in the

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Chapter Handbook.</h3><pre> </body> <hr><h3> <a href="asmc.html"><img
src="left.gif">Return to ASMC Homepage</a></h3> <hr>
<address>sfhurst@nps.navy.mil</address> </html>
```

File: essay.html

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<html> <title>Essay Contest</title> <body> <pre><h2>
 Essay Contest</h2>
<h3>     The essay contest is an opportunity for a triple play.  You can display writing
skills, voice a point of view, and earn cash.
     The topic for 1995 is "Total Quality Financial Management." Many of you are skillful
writers, and hold strong views on the topic.  You may be our next winner! Submissions
must be from ASMC members, endorsed through a local Chapter.  Further instructions
governing the contest are in the Fall issue of Armed Forces Comptroller.  </h3><pre>
</body> <hr><h3> <a href="asmc.html"><img src="left.gif">Return to ASMC
Homepage</a></h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>
```

File: goals.html

```
<html> <title>ASMC in 1995</title> <body> <pre>
            <h3>ASMC  in 1995</h3>
              <h4>Goals</h4>
Enhance the reputation of         Increase Individual and ASMC as an outstanding
      corporate membership. Professional Society.
Present an excellent Support the Professional      National Professional
Development of the          Development Institute and membership.
    support other relevant               training activities.
              <h4>New Initiatives</h4>
Redesigned Armed Forces        Corporate Breakfast Comptroller
            - New Format        Recognition and Rewards - Additional
Color              - Community Service Award - Advertising        - Team
Achievement                Awards Improved          -
Proportional Individual Communications        Awards - Monthly Newsletter
to          - Intern/Trainee Award   Chapters        - Corporate Member -
National Newsletter to      Award   Members          - Chapter
Professional - Newsletter Competition      Development Award - Essay Contest

              Continuing Education          Grants </pre>
</body> <hr><h3> <a href="asmc.html"><img src="left.gif">Return to ASMC
Homepage</a></h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>
```

File: heart.html

<html> <title>Discover the Heart Of It All In Columbus, Ohio</title> <body> <pre><h2> Discover the Heart Of It All In Columbus, Ohio.</h2>
<h3>   Under the theme "Today's Challenges...Tomorrow's Solutions," the Society's PDI'95 is evolving into an outstanding blend of Professional Development, Training, and Networking. The Keynote, Luncheon, and Workshop Topics are designed to underscore the skills and abilities which Resource Managers, System Designers and Operators, and Accounting & Finance personnel must assimilate into their "bag of competencies." They must individually, and as a team, move into the World of Work in the 21st Century. Both the Aviation Chapter and the Buckeye Chapter, co-hosts for PDI '95, are working on an agenda that will provide exciting and informative professional development training. In addition, the Columbus area offers many attractions that will entice you to Come Early and Stay Late.

     Come to Columbus...ethnic repasts, unique educational, cultural and artistic groups; local and national entertainers, amongst splendid architectural surroundings...await. Come and quench your curiosity and palate. Share in the spirit of camaraderie! Come join us at PDI '95 on May 30th - June 2nd in Columbus.

     Come Early...The City of Columbus is much more than you ever dreamed. Columbus has a history of ethnic influence, broad cultural experience and diverse language bases. Experience the restored German, Italian, and Victorian villages. The architecture of yesterday blends with new international owners and tenants. Sample both ethnic and gourmet foods in the Brewery District/ German Village and visit the galleries and bistros of the Short North Market Area.

     Visit the award-winning Wexner Center for the Arts at Ohio State University or take in a show at the recently restored Ohio Palace and Great Southern Theatres. Enjoy the Zoo, Center of Science & Industry, or the Museum of Art, and don't forget the Memorial Golf Tourney. Amble over to the Ohio State University "Horseshoe" Stadium...imagine Archie Griffin running to two Heisman trophies...or the World's largest All-Brass Band, the Ohio State Marching Band performing "Script Ohio."

     Stay Late...within 2 hours drive time from Columbus, there are many family-oriented sites to explore. In Dayton, visit the U.S. Air Force Museum. North of Cincinnati thrill to the rides at Kings Island Amusement Park. In Cleveland see such sites as the Rock n' Roll Hall of Fame, Cedar Point, or Sea World. Explore the Amish Country near Sugarcreek; the Hopewell Indian mounds at Moundbuilders State Park near Newark or the Olentangy Indian Caverns near Delaware. Visit the Carousel Museum at Mansfield or Sandusky.

     Enjoy the handcrafted skills of basket-making at the Lonaberger Company in Dresden or the pottery at the Ohio Ceramic Center in Roseville. There is glass-making at Cambridge's glass Museum and the Ohio Factory Shops await your visit just outside Jeffersonville. Visit the restored Roscoe Village to experience canal life. In Lancaster, the Old Car Club Festival will be held on (June 3-4); also enjoy the Columbus Arts Festival (June 2-4) and Triple-a Baseball with the Clippers.

Whatever your taste, Ohio has something for you. See you in Columbus at PDI '95! </h3><pre> </body> <hr><h3> <img src="left.gif">Return to ASMC Homepage</h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>

File: lead.html

<html> <title>Leadership Opportunities in ASMC</title> <pre><h2>   Leadership Opportunities in ASMC</h2>
 <h3>   ASMC provides many opportunities for you to demonstrate leadership. Although ASMC is not officially part of your chain of command, your demonstrated leadership abilities will not go unnoticed. Simply step forward and:
    a. Serve as a Chapter President or other Chapter officer and   learn the joys and rewards of responsibility.
    b. Serve as the Program chairperson and develop a dynamic and   innovative program.
    c. Write excellent articles for the Armed Forces Comptroller   and/or essay contest.
    d. Serve on a chapter committee and share ideas, expand your   circle of contacts, and help shape the future of ASMC and   our professional community.
    e. Develop a unique and informative newsletter and let it be   recognized throughout ASMC as one of the best.
    f. Recruit new members to participate in ASMC activities.   Last year, Kathy Vaughn of the Indianapolis Chapter won   "Recruiter of the Year" by recruiting more than seventy   (70) members.
Leadership is a series of learned skills, ASMC will give you an opportunity to develop those skills. </h3><pre> </body> <hr><h3> <img src="left.gif">Return to ASMC Homepage</h3> <hr>
<address>sfhurst@nps.navy.mil</address> </html>

File: life.html

```
<html> <title>Life Membership</title> <body> <pre><h2>
             Life Membership</h2>
<h3>    ASMC, unlike many organizations, has a special road to life membership.  You
can only become a life member after 20 consecutive years of membership.  At this time,
ASMC membership is available at no cost to the life member.  This is done to place special
emphasis on sustained support of the society.
    ASMC may at some juncture offer multiple year membership; however, the way to life
membership will remain indicative of continued support of ASMC.  Approximately 200
members will become life members this year.  To these members we say Congratulations
and thanks for your support. </h3><pre> </body> <hr><h3> <a href="asmc.html"><img
src="left.gif">Return to ASMC Homepage</a></h3> <hr>
<address>sfhurst@nps.navy.mil</address> </html>
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File: natoff.html

```
<html> <title> Your National Officers</title> <body> <pre> <h3> Your National
Officers</h3>
POSITION              NAME                    COMMERCIAL NO        President
     Mr. William Campbell        202-267-6681 VP-OSD             Mr. Ron Davidson
          703-695-3950 VP-Army           Mr. Bob Young           703-756-0217
VP-Navy             Ms. Gladys Commons        703-697-2325 VP-Air Force
Ms. Marti Maust            703-697-8250 VP-USMC             Mr. Lee Dixson
 703-614-1150 VP-USCG             Captain Ronald D. Reck      202-267-1315
Secretary           Mr. Richard Freethey       202-267-1142 Treasurer          CDR
John O'Connor         202-267-1298 Gen. Counsel        Mr. Phil Hitch
703-697-7228 Executive Director     LTG (Ret.) James F. McCall    800-462-5637
</h3><pre> </body> <hr><h3> <a href="asmc.html"><img src="left.gif">Return to
ASMC Homepage</a></h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>
```

File: natres.html

<html> <title>National Research</title> <pre><h2>   National Research</h2>
<h3>   The ASMC National Research Committee (NRC) was created to promote research into topics of interest to the military comptrollership community or one of its principal disciplines, e.g., Accounting, Program/Budget or Cost Analysis. The primary method is by encouraging individuals, teams or ASMC Chapters to undertake research projects. Those wishing to conduct research for recognition by the Society are asked to submit a research proposal to the NRC in an appropriate format. Upon receipt, the NRC chairperson appoints a Project Subcommittee, consisting of at least two regular or adjunct members of the NRC, to serve as research mentors. The subcommittee evaluates the acceptability of proposed projects and offers guidance to the researcher(s) on study methodology, content and style.
    Recognition of research is accomplished in two ways. First, the Society annually bestows one or more research awards to recognize individual or team efforts that result in specific, high quality, written papers on a topics of interest. Second, ASMC Chapters that sponsor such research may receive up to 500 points annually under the Chapter Competition Program (as discussed more fully in ASMC's Research Handbook). In addition, the NCR currently is developing a new program to recognize excellence in the research of comptrollership topics by students and faculty at selected DOD schools and DOD-sponsored programs of professional development. For more information on this program, call National Headquarters. </h3><pre> </body> <hr><h3> <img src="left.gif">Return to ASMC Homepage</h3> <hr> <address>sfhurst@nps.navy.mil</address> </html>

File: **scholar.html**

<html> <title>Scholarship Program</title> <body> <pre><h2>   Scholarship Program</h2>
<h3>   ASMC continues its long standing program of awarding ten (10) scholarships to outstanding high school graduating seniors. Five awards will be made in the amount of $1,000 and five awards will be made in the amount of $2,000. These scholarships are supported primarily from corporate member dues. For consideration, each applicant must be nominated by a local ASMC Chapter. Selection criteria includes scholastic achievements, leadership ability, extracurricular activities, career and academic goals and financial need. National winners are recognized in the Armed Forces Comptroller magazine and Awards Program.

    Many local chapters also run a smaller, parallel program. Contact your local chapter for more information. </h3><pre> </body> <hr><h3> <img src="left.gif">Return to ASMC Homepage</h3> <hr>
<address>sfhurst@nps.navy.mil</address> </html>

File: correspond.html

<html> <title> Correspondence Courses</title>
<h1>Correspondence Courses</h1>
<hr> <h4> ADVANCED LEVEL SUSTAINMENT TRAINING
TECHNICAL COURSE (MOS 73C40/73D40) <p> <a
href="c102.txt">APPROPRIATION AND COST ACCOUNTING <p> <a
href="c103.txt">BASIC LEVEL SUSTAINMENT TRAINING COURSE <p> <a
href="c104.txt">BASIC PAY ENTITLEMENTS <p> <a
href="c106.txt">CENTRAL ACCOUNTING OFFICER COURSE <p> <a
href="c107.txt">CIVILIAN PAY INTRODUCTORY COURSE <p> <a
href="c108.txt">CIVILIAN PAY MANAGEMENT SUPERVISOR <p> <a
href="c109.txt">COST ANALYSIS SPECIALIST<p> <a
href="c110.txt">DISBURSING OPERATIONS MANAGEMENT COURSE <p> <a
href="c111.txt"> DISBURSING, PART I   <p> FIELD
BUDGET FORMULATION <p> FINANCE OFFICER
ADVANCED COURSE - RESERVE COMPONENT <p>
FINANCE OFFICER BRANCH QUALIFICATION COURSE <p> <a
href="c115.txt">FINANCIAL MANAGEMENT <p> <a
href="c116.txt">FINANCIAL MANAGEMENT IN THE NAVY <p> <a
href="c119.txt">FINANCIAL MANAGEMENT SPECIALIST (ACCOUNTS
CONTROL) <p> FINANCIAL MANAGEMENT SPECIALIST
(COMMERCIAL SERVICES & ATRAS) <p> FINANCIAL
MANAGEMENT SPECIALIST (INTRODUCTION) <p> <a
href="c123.txt">FINANCIAL MANAGEMENT SPECIALIST (MATERIEL) <p>
FINANCIAL SERVICES SPECIALIST (INTRODUCTION)
<p> FINANCIAL SERVICES SPECIALIST (MILITARY AND
CIVILIAN PAY)<p> FINANCIAL SERVICES SPECIALIST
(TRAVEL) <p> FISCAL ACCOUNTING FOR SUPPLY
CLERKS <p> INTRODUCTION TO DEFENSE FINANCIAL
MANAGEMENT <p> INTRODUCTION TO MARINE
CORPS ACCOUNTING <p> INTRODUCTION TO NAVY
FINANCIAL AND MANAGERIAL ACCOUNTING <p> <a
href="c131.txt">INTRODUCTION TO NAVY INDUSTRIAL ACTIVITIES DEFENSE
BUSINESS OPERATIONS FUND <p> INTRODUCTION TO
OPERATIONS RESEARCH <p> MANAGEMENT
STATISTICS <p> MILITARY ACCOUNTING SUPERVISOR
COURSE <p> MILITARY ACCOUNTING TECHNICIAN
COURSE <p> OPERATIONS RESEARCH/SYSTEMS
ANALYSIS FAMILIARIZATION COURSE<p> PERSONAL
FINANCE <p> PLANNING, PROGRAMMING, BUDGET &
EXECUTION SYSTEM (PPBES) COURSE <p> PRINCIPLES

OF NAVY BUDGETING <p> RESOURCE ADVISOR <p> RESOURCE MANAGEMENT BUDGET COURSE (RMBC) <p> RESOURCE MANAGEMENT INTRODUCTORY COURSE <p> RESOURCE MANAGEMENT QUANTITATIVE COURSE (RMQC) <p> RESOURCE MANAGEMENT TACTICAL COURSE <p> RESOURCE MANAGEMENT/COMPTROLLERSHIP COURSE <p> MILITARY PAY INTRODUCTION FINANCE COURSE <p></h4>
<hr>
Return to Catalog of Courses<p>
 <A HREF="ftp://ftp.nps.navy.mil/pub/dbmu/thesis/tom.html"> Return to Main Menu<p> </HR> <address>tmmcgrat@nps.navy.mil</address>
</html>

File: form.html

```html
<html>
<title> Formal Courses </title>
<h1>Formal Courses</h1><hr>
<h4> <a href = "af-aa-01.txt">  PROFESSIONAL AUDITOR TRAINING SCHOOL -
ENTRY LEVEL</a><p> <a href =  "af-aa-02.txt"> INTERMEDIATE AUDITOR
SCHOOL</a><p> <a href =  "af-aa-04.txt">  AUDIT COMMUNICATIONS
SCHOOL</a><p> <a href =  "af-au-01.txt"> PROFESSIONAL MILITARY
COMPTROLLER COURSE</a><p> <a href =  "af-au-02.txt">  RESERVE FORCES
PROFESSIONAL MILITARY COMPTROLLER COURSE</a><p> <a href =
"af-it-02.txt"> PRINCIPLES OF COST ANALYSIS</a> <p> <a href =  "af-it-03.txt">
LEARNING CURVE ANALYSIS (JT)</a><p> <a href =  "af-it-04.txt">
QUANTITATIVE TECHNIQUES FOR COST AND PRICE ANALYSIS (JT)</a><p>
<a href =  "af-it-05.txt">  CONTRACTOR OVERHEAD MONITORSHIP (JT)</a><p>
<a href =  "af-it-07.txt">  ADVANCED QUANTITATIVE METHODS FOR COST
ANALYSIS (JT)</a> <p> <a href =  "af-it-08.txt">  ADVANCED COST ANALYSIS
(JT)</a><p> <a href =  "af-it-09.txt">  INTRODUCTION TO LIFE CYCLE COSTING
(AF)</a><p> <a href =  "af-it-10.txt">  FINANCIAL MANAGEMENT IN MAJOR
WEAPON SYSTEMS ACQUISITION</a><p> <a href =  "af-it-11.txt">
SURVEILLANCE OF COST SCHEDULE CONTROL SYSTEM CRITERIA
(C/SCSC)</a> <p> <a href =  "af-it-12.txt">  COST/SCHEDULE CONTROL
SYSTEMS CRITERIA</a> <p> <a href =  "af-it-13.txt">  BASIC ANALYSIS OF
PERFORMANCE MEASUREMENT</a><p> <a href =  "af-sh-01.txt">  FINANCIAL
MANAGEMENT (FINANCIAL SERVICES)</a><p> <a href =  "af-sh-02.txt">
ACCOUNTS CONTROL</a><p> <a href =  "af-sh-03.txt">  AUDITOR RETRIEVAL
SYSTEMS</a> <p> <a href =  "af-sh-06.txt">  CIVILIAN PAY</a><p> <a href =
"af-sh-07.txt">  COMMERCIAL SERVICES</a><p> <a href =  "af-sh-08.txt">
FINANCIAL MANAGEMENT (STAFF OFFICER)</a><p> <a href =  "af-sh-09.txt">
FINANCIAL MANAGEMENT (ARF), STAFF OFFICER</a> <p> <a href =
"af-sh-10.txt">  FINANCIAL MANAGEMENT (FINANCIAL ANALYSIS)</a><p> <a
href =  "af-sh-11.txt">  FINANCIAL ANALYSIS APPRENTICE</a> <p> <a href =
"af-sh-12.txt">  FINANCIAL MANAGEMENT APPRENTICE</a><p> <a href =
"af-sh-14.txt">  FINANCIAL SERVICES APPRENTICE</a><p> <a href =
"af-sh-16.txt">  MATERIEL </a><p> <a href =  "af-sh-17.txt">  MILITARY PAY</a>
<p> <a href =  "af-sh-18.txt">  TRAVEL (USAF)</a><p> <a href =  "ar-aa-03.txt">
AUDITOR TRAINEE SCHOOL</a><p> <a href =  "ar-aa-06.txt">  INTERMEDIATE
AUDITOR SCHOOL</a><p> <a href =  "ar-aa-07.txt">  LEVEL 1 ADP FOR
AUDITORS</a> <p> <a href =  "ar-aa-08.txt">  LEVEL 2 ADP FOR AUDITORS</a>
<p> <a href =  "ar-aa-09.txt">  LEVEL 3 ADP FOR AUDITORS </a><p> <a href =
"ar-aa-10.txt">  BASIC REPORT WRITING SEMINAR</a> <p> <a href =
"ar-aa-11.txt">  SENIOR AUDITOR SCHOOL</a><p> <a href =  "ar-aa-12.txt">
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AUDITOR-IN-CHARGE REPORT WRITING SEMINAR <p> AUDIT SUPERVISOR REPORT WRITING SEMINAR <p> AUDIT SUPERVISOR SCHOOL<p> AUDIT MANAGER SCHOOL<p> BUDGET TRAINING <p> CONSTRUCTION COST ENGINEERING WITH MICROCOMPUTER-AIDED COST ESTIMATING SYSTEM (MACES GOLD)<p> CORPS OF ENGINEERS RESOURCE AND MILITARY MANPOWER SYSTEM (CERAMMS) MODEL<p> DD FORM 1391 PROCESSOR SYSTEM <p> ECONOMIC ANALYSIS-WRP<p> ECONOMIC ANALYSIS FOR MCA <p> FINANCE AND ACCOUNTING SYSTEM TRAINING <p> ACCOUNTING SPECIALIST <p> ADVANCED MANAGEMENT ACCOUNTING AND ANALYSIS <p> COMMERCIAL ACCOUNTS ADMINISTRATION <p> DISBURSING OPERATIONS <p> FINANCE SPECIALIST <p> MILITARY ACCOUNTING <p> PLANNING, PROGRAMMING, BUDGETING AND EXECUTION SYSTEM (PPBES)<p> RESOURCE MANAGEMENT BUDGET<p> RESOURCE MANAGEMENT IN TACTICAL UNITS <p> RESOURCE MANAGEMENT INTRODUCTORY<p> TRAVEL ADMINISTRATION AND ENTITLEMENTS <p> CIVILIAN PAY MANAGEMENT<p> CIVILIAN PAYROLL TECHNICIAN <p> JOINT SERVICE PAY OPERATIONS<p> FISCAL LAW<p> COST ANALYSIS FOR DECISION MAKING <p> COST ESTIMATING FOR ENGINEERS <p> DECISION RISK ANALYSIS <p> MANPOWER AND FORCE MANAGEMENT <p> OPERATIONS RESEARCH SYSTEMS ANALYSIS CONTINUING EDUCATION PROGRAM<p> COST RISK ANALYSIS SPECIAL TOPICS SEMINAR<p> OPERATIONS RESEARACH/SYSTEMS ANALYSIS (ORSA) SPECIAL TOPICS SEMINAR<p> MANAGEMENT OF DEFENSE ACQUISITION CONTRACTS (BASIC)<p> COST ACCOUNTING STANDARDS WORKSHOP <p> ADMINISTRATIVE SYSTEMS ANALYSIS AND DESIGN <p> ADVANCED MANAGEMENT ANALYSIS<p> THE ARMY INTERNAL CONTROL PROGRAM INSTRUCTORS INSTITUTE ARMY INTERNAL CONTROL PROGRAM <p> BASIC MANAGEMENT STATISTICS <p> DEFENSE WORK

MEASUREMENT STANDARD TIME DATA (DWMSTD) DEFENSE WORK METHODS AND STANDARDS <p> ECONOMIC ANALYSIS APPLICATIONS<p> ECONOMIC ANALYSIS FOR DECISION MAKING<p> ECONOMIC ANALYSIS FOR MANAGERS <p> DESIGNING AND ANALYZING STATISTICAL EXPERIMENTS<p> FINANCIAL PLANNING AND CONTROL TECHNIQUES <p> METHODS-TIME MEASUREMENT 1A<p> ORGANIZATION PLANNING <p> PLANNING AND CONDUCTING MANAGEMENT STUDIES<p> PRODUCTIVITY MEASUREMENT AND ENHANCEMENT METHODS<p> PROJECT PLANNING AND CONTROL TECHNIQUES<p> QUALITY CIRCLE FACILITATORS <p> REGRESSION ANALYSIS<p> WORK PLANNING AND CONTROL SYSTEMS<p> ACTIVITY BASED COSTING PRINCIPLES<p> ACTIVITY BASED COSTING INTRODUCTION<p> STRATEGIC PLANNING PRINCIPLES <p> FUNCTIONAL ECONOMIC ANALYSIS<p> <a href = "ar-me-52.txt UNIT COST/DBOF PRINCIPLES AND GUIDELINES <p> BASIC INTERNAL REVIEW COURSE (NATIONAL GUARD BUREAU)<p> INTERMEDIATE INTERNAL REVIEW COURSE (NATIONAL GUARD BUREAU) <p> AUDITOR REFRESHER COURSE <p> SUPERVISORY AUDITOR COURSE<p> USAR BUDGET MANAGEMENT COURSE <p> DEPUTY CHIEF OF STAFF RESOURCE MANAGEMENT/DEPUTY CHIEF OF STAFF COMPTROLLERMANAGERS COURSE (D2FMC)<p> DAILY ORDERS LEDGER FINANCE SYSTEM OPERATOR COURSE (DOLFINS)<p> USAR UNIT PAY ADMINISTRATION COURSE (UPAC)<p> ADVANCED RESOURCE MANAGEMENT COURSE<p> US ARMY COMPTROLLERSHIP PROGRAM (ACP) <p> COMMERCIAL ACCOUNTS <p> BASIC INTRODUCTION TO BUSINESS MANAGEMENT<p> MECHANIZATION OF CONTRACT ADMINISTRATION SERVICES SYSTEM (MOCAS) OVERVIEW <p> ACCOUNTING ADJUSTMENTS <p> CONTRACT ADMINISTRATION REPORT (CAR)<p> CONTRACT AND MOD INTRODUCTION <p> CONTRACT INPUT <p> CONTRACT RECONCILIATION <p> LINE ITEM SCHEDULE SUMMARY REPORT

(LISSR)<p>   DISBURSEMENT INPUT<p>   INVENTORY CONTROL (CONT/MOD)<p>   INVOICE CONTRACTOR INQUIRIES<p>   INVOICE CONTROL<p>   MOD INPUT (MILSCAP)<p>   INVOICE INPUT <p>   PAYMENT BATCH (DISB)<p> VOUCHER EXAMINATION<p>   AAS INPUT AND RECONCILIATION <p>   DOD, DFAS, AND GENERAL ACCOUNTING <p>   FUNDAMENTALS OF GENERAL ACCOUNTING <p>   APCAPS PAYROLL (AUTOMATED PAYROLL COST AND PERSONNEL SYSTEM)<p> DEFENSE LOGISTIC AGENCY (DLA) UNIT COST COURSE<p>   SELECTED ACQUISITION REPORT COURSE <p>   CONTRACTOR PERFORMANCE MEASUREMENT COURSE <p>   ADVANCED DISBURSING COURSE<p>   BASIC DISBURSING CLERKS COURSE <p>   FINANCIAL MANAGEMENT CAREER COURSE<p>   FINANCIAL MANAGEMENT OFFICER COURSE<p>   FISCAL ACCOUNTING COURSE<p>   ECONOMIC ANALYSIS <p>   DISBURSING CLERK AFLOAT AUTOMATED PAY SPECIALIST<p>   DISBURSING CLERK FISCAL PROCEDURES <p>   DISBURSING CLERK TRAVEL PAYMENTS<p>   FINANCIAL AND MATERIEL MANAGEMENT TRAINING COURSE<p>   RAMCAS ACCOUNTING (BOOKKEEPING) <p>
    MWR SENIOR MANAGERS' FINANCIAL MANAGEMENT<p>   INTRODUCTION TO NAVY FINANCIAL AND MANAGERIAL ACCOUNTING<p>   PRINCIPLES OF NAVY BUDGETING<p> PROFESSIONAL INDUSTRIAL FUND MANAGERS COURSE<p>   INTRODUCTION TO NAVY INDUSTRIAL ACTIVITIES FOR DEFENSE BUSINESS OPERATIONS FUND <p> MARINE CORPS PRACTICAL COMPTROLLERSHIP<p>   PRACTICAL COMPTROLLERSHIP COURSE <p>   FINANCIAL MANAGEMENT CURRICULUM <p>   DEFENSE RESOURCES MANAGEMENT COURSE <p>   DEPARTMENT OF DEFENSE (DOD) GRADUATE LEVEL FINANCIAL MANAGEMENT PROGRAM <p> DISBURSING CLERK CLASS "A"<p></h4> <hr> Re turn to Catalog of Courses<p>

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<A HREF="ftp://ftp.nps.navy.mil/pub/dbmu/thesis/tom.html"> Return to Main
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File: interact.html

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FINANCIAL STATEMENTS</a><p> <a href="i106.txt">CAPITAL BUDGETING
</a><p> <a href="i111.txt">ECONOMIC ANALYSIS FUNDAMENTALS</a><p> <a
href="i112.txt">FINANCE, BUSINESS, MONEY MANAGEMENT</a><p> <a
href="i113.txt">FINANCIAL MANAGEMENT</a><p> <a
href="i115.txt">FINANCING FOR LONG-TERM GROWTH</a><p> <a
href="i117.txt">FUNDS FLOW STATEMENTS: PREPARATION AND USES</a><p>
<a href="i121.txt">PERSONAL FINANCIAL MANAGEMENT</a><p> <a
href="i122.txt">PERSONAL FINANCIAL SKILLS</a><p> <a
href="i126.txt">SELLING: THE STRATEGIC APPROACH</a><p> <a
href="i128.txt">SHORT-TERM FINANCIAL PLANNING </a><p> <a href="i130.txt">
UNDERSTANDING THE BALANCE SHEET  </a><p> <a
href="i131.txt">UNDERSTANDING THE INCOME STATEMENT</a><p> <a
href="i133.txt">TRAVEL ADMINISTRATION TRAINING </a><p> <a
href="i134.txt">DISBURSING OPERATIONS </a><p> <a href="i135.txt">STANFINS
REDESIGN-1</a><p> <a href="i136.txt">COMMERCIAL ACCOUNTS
ADMINISTRATION TRAINING</a><p> </h4><hr> <a
href="ftp://ftp.nps.navy.mil/pub/dbmu/thesis/catalog/catmain.html ">Return to Catalog of
Courses</a><p>
<a href="ftp://ftp.nps.navy.mil/pub/dbmu/thesis/tom.html">Return to Main Menu</a><p>
<hr> <address>tmmcgrat@nps.navy.mil</address> </html>
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File: home.html

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<html> <title>DRMI Homepage</title> <img SRC="tree.gif"><p> <img
SRC="bluebar2.gif"><p>
<h2>DRMI</h2>
<body> <pre><h3>ORGANIZATION</h3>
    <h4> The Defense Resources Management Institute (DRMI), formerly the Defense
```
Resources Management Education Center (DRMEC), is an educational institution
sponsored and supervised by the Secretary of Defense and located at the Naval
Postgraduate School in Monterey, California. Since 1965, the Institute has conducted
professional education programs in analytical decision making and resources management
for military officers of all services and senior civilian officials of the United States and 125
other countries. These programs are presented on a regularly scheduled basis at DRMI in
Monterey and by specific arrangement at other locations in the United States and
overseas.

The principal focus of all DRMI programs is developing an understanding and
appreciation of the concepts, techniques, and decision making skills related to defense
resources management. The goal of the Institute's programs is to enhance the effective
allocation and use of resources in modern defense organizations.
```
<h3>OBJECTIVES</h3>
```
The central focus of all educational programs conducted by DRMI is analytical
decision making. The emphasis is not on training in job-specific skills, but rather on the
concepts, techniques, and issues that pervade defense resources management decision
making in most midthrough executive-level positions. Each course provides a
multi-disciplinary program which encourages participants to:
  Develop an understanding of concepts, principles, methods, and techniques drawn from:
    Management Theory -- examination of the current state of management thought   and
organized action;
    Economic Reasoning -- topics dealing with the basic tenet of scarcity of   resources
relative to competing needs and wants; and
    Quantitative Reasoning -- the basic language and analytic tools which are   the
foundation of modern decision theory.
  Integrate these ideas into a systematic process for resources allocation decision making
and effective resource utilization, and
  Apply these concepts to illustrative examples of:
    Allocating scarce resources to competing needs;
    Analyzing and evaluating management systems, programs, and policies; and
    Maximizing benefits within existing resource constraints, or minimizing resource
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consumption to achieve a predetermined level of benefit.<p></h4> <h3><hr>
```
<img src= "blueb.gif"> Schedule<p>
<img src= "blueb.gif"> Prerequisites<p>
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<a href="/DBMU/DRMI/contents.html"><img src= "blueb.gif"> Course
Content</a><p></h3> </ul>
</body> <hr> <a href="/DBMU/resources.html"><img src="home.gif>Return to
Resources Page</a><p><hr> For <blink>Comments and Suggestions</blink> concerning
this homepage please contact:<p> <address>sfhurst@nps.navy.mil</address><p> Steve
Hurst - Homepage Manager </html>
```

File: contents.html

<html> <title>DRMI Course Contents</title> <pre><h4>   <h3> Defense Resources Management Institute   Course Content</h3> <img src="bluebar2.gif"><p>   The syllabus of the current four week Defense Resources Management Course is provided as an example of course content
* * *

THE TEMPO MILITARY PLANNING GAME   Is an exercise which involves the assignment of course participants to team groups which   act together to make a series of resource allocation decisions during a one day (first day   of the course) play of the game. The game illustrates many of the basic concepts   involved in modern defense management such as opportunity cost, quantitative   considerations in analysis, alternatives in decision making, marginal analysis,   cost-effectiveness, and others.

THE DEFENSE MANAGEMENT CHALLENGE   Develops a conceptual framework that relates the Military Planning Game and the   curriculum to the challenge of defense management: the efficient use of scarce resources   to provide for a nation's security.

MILITARY ENVIRONMENT OF NATIONAL SECURITY   Reviews the threats facing the US and our allies.

GLOBAL/POLITICAL ENVIRONMENT OF DEFENSE MANAGEMENT   Identifies the major factors and forces that are influencing change world wide and   affecting defense management.

DEFENSE ORGANIZATION, MANAGEMENT SYSTEMS AND PRODUCTIVITY   Examines the development of defense organization and management systems within the DoD and relates them to the problem of efficient and effective allocation of resources.

TOOLS OF QUANTITATIVE REASONING   Reviews selected basic fundamentals of mathematics, including connectives, operators,   functions, and linear relationships.

INTRODUCTION TO ANALYTICAL DECISION MAKING   Presents the role of analytical decision techniques in defense resource management.

RESOURCE ALLOCATION PERSPECTIVES   Explores the various perspectives on resource allocation that will be developed throughout   the course.

MODEL BUILDING AND QUANTIFICATION   Provides perspective on the process of modeling and its use in the analytic process.

MODELING AND DECISION MAKING   Illustrates the use of a mathematical model in aiding the decision making process.

ECONOMIC ENVIRONMENT OF DEFENSE MANAGEMENT   Introduces the subject of economics, indicates that defense resources allocation is an   economic problem of choice and examines the external economic environment of defense.

RESOURCES AVAILABLE FOR DEFENSE   Emphasizes the increased pressures on defense agencies for greater efficiency and   economy in the use of scarce national resources.

ECONOMY AND EFFICIENCY   Presents a model of optimal resource allocation.

DECISION MAKING AT THE MARGIN   Introduces concepts of marginal reasoning; demonstrates the relationships between total,   average, and marginal values; and presents two fundamental resource allocation   propositions that utilize marginal values.

DEFENSE RESOURCES MANAGEMENT   Provides perspective on defense resources management and the course. DESCRIBING DATA WITH STATISTICS   Introduces basic concepts underlying the use of statistics and examines basic statistical   measures; statistical terms are defined and examples of the use of measures of central   tendency and dispersion are presented.

DECISION ENVIRONMENTS   Discusses three decision environments and contrasts deterministic and non-deterministic   views of the world; defines "probability" and provides examples of the assessment of   probabilities.

CHOOSING METHODS OF DECISION ANALYSIS   Reviews the distinctions among the three basic decision states -- risk, certainty, and   uncertainty -- and introduces strategy alternatives for each; decision making under "risk"   is examined in detail to illustrate expected value analysis.

SEQUENTIAL DECISIONS UNDER RISK   Introduces joint, conditional, and marginal probabilities; describes a "decision tree;" and   evaluates additional information in a "risk" environment.

PRODUCTION AND UNIT COST ANALYSIS I   Develops the economic logic underlying production -- the transforming of resources into   outputs; shows how the understanding of this logic can help defense managers be aware   of the most cost-effective level of operations.

PRODUCTION AND UNIT COST ANALYSIS II   Uses marginal concepts and the isoquant-isocost curve techniques to demonstrate the   logical process of seeking economy-efficiency solutions in productive activities, and   shows the usefulness of this approach in defense resource decisions.

EFFECTIVE MANAGEMENT UNDER RISK I   Introduces probability distributions, develops the Binomial distribution, and combines this   with an extension of expected value analysis.

EFFECTIVE MANAGEMENT UNDER RISK II   Provides an understanding of the Poisson and Normal probability distributions and   discusses their use in the analytic process.

PROBABILITY AND DECISIONS   Introduces the concept of statistical inference and demonstrates how it can be used to   associate probability statements with interval estimates of population parameters.

EFFECTIVE MANAGEMENT UNDER UNCERTAINTY   Uses the microcomputer and electronic spreadsheet as tools to help analyze sensitivity of   decision information to changes in parameter values. Provides a variety of tools - both   general and analytical - that can be used to help manage uncertainty.

HYPOTHESIS TESTING   Extends the discussion of statistical inference to include the procedure for conducting a   hypothesis test of significant change.

REDUCING UNCERTAINTY   Extends the discussion of hypothesis testing to the empirical construction of probability   distributions using non-parametric tests.

COST-OUTPUT ANALYSIS   Examines the role and usefulness of cost-output analysis in resource allocation situations,   and extends the discussion of cost-output to cost-effectiveness.

PROBABILISTIC PROCESSES   Discusses and demonstrates methods of modeling probabilistic behavior that changes over   time.

COST CONCEPTS AND ANALYSIS   Discusses the importance of cost estimates as a vital part of the information needed by   decision makers and outlines basic concepts used in estimating costs.

COST ACCOUNTING AND ANALYSIS   Discusses the major elements and concepts of cost accounting and describes the use of   cost accounting information to control costs and manage operations.

ANALYSIS OF DYNAMIC PROBLEMS   Discusses the role of the time dimension in decision making.

REGRESSION ANALYSIS   Demonstrates the usefulness and limitations of simple linear regression and correlation   analysis.

FORECASTING   Presents the principles of forecasting, introduces various methods of forecasting and   discusses the role of forecasting in the planning process.

COST ESTIMATING RELATIONS   Discusses the rationale for and usefulness of cost estimating relationships in the   determination of systems cost.

INTRODUCTION TO MULTI-CRITERIA DECISION MAKING   Introduces a framework for analyzing decision problems which have multiple goals and   objectives.

MEASURES OF EFFECTIVENESS IN EVALUATION   Discusses how objectives and their related effectiveness measures are defined in a multi-   criteria decision problem.

QUANTIFYING PREFERENCES AND EFFECTIVENESS MEASURES   Introduces the concepts of preference and indifference and illustrates how they are used to   quantify the decision maker's values in a multi-criteria decision problem. INTEGRATING PREFERENCES AND EFFECTIVENESS MEASURES   Demonstrates how measures of effectiveness and the decision maker's preferences can be   integrated into a solution methodology for multi-criteria decision problems.

MANAGEMENT CONTROL AND CONTROL TECHNIQUES   Introduces the basic concepts of management control and examines the value of network   analysis in management control.

DECISION SUPPORT SYSTEMS   Examines the role played by problem structure in determining the approaches taken by the   decision maker and the decision making process. Special emphasis is placed on the   impact of microcomputer technology as a personal productivity tool.

SYSTEMS ANALYSIS   Discusses the fundamentals of systems analysis and emphasizes the socratic, iterative   nature of analytical decision making in an uncertain world.

EVOLUTION OF FEDERAL BUDGETING   Traces and interprets the history of U. S. federal budgeting as a basis for understanding   its present status and probable course of future evolution.

PROGRAM BUDGETING   Surveys the three major approaches to budgeting for public purchase programs.

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UNIT COST BUDGETING   Provides a conceptual framework for understanding the uses of unit cost budgeting.

DEFENSE BUSINESS FUNDS   Discusses the concept of working capital funds and applies it to improved management of   operations in DoD.

PLANNING, PROGRAMMING, AND BUDGETING IN DoD   Describes the component parts of the PPB system in DoD and the current annual PPB   cycle; emphasis is placed upon the unique flexibility of PPB in dealing with changes in   the military resource allocation environment.

DEFENSE INDUSTRIAL ORGANIZATION   Provides an overview of the structure, performance, and efficiency of US defense   industries.

DEFENSE ACQUISITION PROCESS   Outlines the current process for management of the development and procurement of   major defense systems in contrast to other historical   pproaches and examines their relative   strengths and weaknesses.

SYSTEMS ANALYSIS AND STRATEGIC PLANNING   Reviews the role of systems analysis in defense decision making and provides an example   of the application of analysis in the strategic planning process.

VIEWS OF WORK AND HUMAN PERFORMANCE   Describes individual and group processes of learning and motivation and explores how   characteristics of work settings can facilitate or impede these processes.

ORGANIZATIONAL CHANGE   Describes systematic approaches to "significant" organizational change.

CONGRESSIONAL BUDGET REFORM   Examines the federal resource allocation environment leading up to the Congressional   Budget Reform Act of 1974 and discusses some of the implications of its ongoing   implementation.</h4></pre> <hr> <h2>Return to Resources Page<p></h2><hr> For Comments and Suggestions concerning this homepage please contact:<p>
<address>sfhurst@nps.navy.mil</address><p> Steve Hurst - Homepage Manager
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File: prereq.html

```
<html> <title> DRMI Prerequisites</title>
 <body> <pre><h4><h2>          Defense Resources Management Institute
          Prerequisites</h2> <img src="bluebar2.gif><p>
<h3>WHO  MAY  ATTEND:</h3>
```
Military Officers, Grades 0-4 and above, of all services.
Civilian DoD employees, GS-11 and above, or in accelerated career development
programs.
Equivalent military and civilian officials of other nations. English language capability
required; MASL No. P162002.
```
<h3>PREREQUISITES:</h3>
```
The course is unclassified and there are no academic prerequisites; however, the course is
conducted at a college level, and has a strong emphasis on quantitative techniques.
Therefore, some experience with college course work (including algebra) will prove
helpful.
```
<h3>QUOTA CONTROL:</h3>
 <h3>ARMY</h3>
```
Commander, U.S. Army Materiel Command (Attn: AMCPE-CC-E)
5001 Eisenhower Avenue, Rm. 7N31 Alexandria, VA 22333-0001 DSN: 284-5167
Comm: (703) 274-5167 Fax: (703) 274-5723
```
<h3>NAVY/MARINE CORPS</h3>
```
Defense Resources Management Institute (Code
6401) Naval Postgraduate School Monterey, CA 93943-5201 DSN: 878-2104/2306
Comm: (408) 656-2104/2306
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<h3>AIR FORCE</h3>
```
Headquarters, 2AF/DOPN 721 Hanger Road, Suite 103 Kessler
AFB, MS 39534-2804 DSN: 597-1329 Comm: (601) 377-1329 Fax: (601) 377-1210
```
 <h3>OSD/JCS and DOD AGENCIES</h3>
```
Washington Headquarters Services
Employee Career Development and Training Division Room 3B-347, The Pentagon
Washington, D.C. 20301-1155 DSN: 327-3422 Comm: (703) 607-3422 Fax: (703)
607-3464
```
Additional quotas may be requested and more detailed information obtained upon direct
request from:
          Defense Resources Management Institute                1522 Cunningham
Road, Room 106          Naval Postgraduate School                Monterey,
California  93943-5201          DSN  878-2104/2306                Commercial
 (408) 656-2104/2306                Fax  (408) 656-2139 `</h4></pre> <img`
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src="bluebar2.gif><p> <h3>Return to DRMI
HomePage<p><hr> For Comments and Suggestions concerning this
homepage please contact:<p> <address>sfhurst@nps.navy.mil</address><p> Steve Hurst
- Homepage Manager </h3>
</html>
```

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File: sked.html

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src="bluebar2.gif"> <body>
<pre> <h3>                          CY1995              Defense Resources
Management Institute                       Schedule of Classes
                January 9 -- February 3
                    April 24 -- May 18
                     May 22 -- June 16
                    July 24 -- August 17
                August 21 -- September 15
</h3></pre> </body> <img src="bluebar2.gif"> <h2><a href="home.html">Return to
DRMI Homepage</a><p></h2><hr> For <b>Comments and Suggestions</b> concerning
this homepage please contact:<p> <address>sfhurst@nps.navy.mil</address><p> Steve
Hurst - Homepage Manager
</html>
```

File: distance.html

<html> <title>Distance Learning Information</title>
<body> <h2>Distance Learning </hr> <iMG ALIGN=bottom
SRC="ftp://pub/dbmu/thesis/asmc/undercon.gif"> UNDER CONSTRUCTION
8)<p> <h2>Coming soon to a screen near you..............</h2><p> <listing> * * ^
\=/</listing> </body> <hr> <A HREF="tom.html"><IMG ALIGN=bottom
SRC="left.gif"> RETURN TO MAIN PAGE </Body> <hr> <h3>For comments or
suggestions please contact: <address>sfhurst@nps.navy.mil</address> Steve Hurst
DBMU - Homepage Manager</h3>
</html>

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APPENDIX B. DBMU SURVEY QUESTIONS

DEFENSE BUSINESS MANAGEMENT UNIVERSITY
Automated Systems Capability Questionnaire

Section I
Current Capabilities

In order for us to determine what applications you can run, and what interconnections you possess, please answer the following questions:

1. What would best describe your primary office computer? (Please circle only one)
   A. IBM-PC 8088 microprocessor
   B. IBM-PC 80286 microprocessor
   C. IBM-PC 80386 microprocessor
   D. IBM-PC 80486 microprocessor
   E. IBM-PC Pentium microprocessor
   F. Apple Macintosh
   G. Other (Specify:_____)

2. The primary disk operating system for our office is: (Please circle only one)
   A. MS-DOS
   B. MS-DOS with Windows
   C. DR-DOS
   D. IBM OS/2
   E. Other (specify:_____)

3. My office computer is connected to a Local Area Network (LAN).
   A. Yes
   B. No
   C. I do not know

4. I have access to a computer with a modem
   A. Yes
   B. No
   C. I do not know

5. I have access, via an office computer, to the Defense Data Network (DDN).
   A. Yes
   B. No
   C. I do not know

6. I have access, other than the Defense Data Network, to the Internet.
   A. Yes
   B. No
   C. I do not know

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7. My computer is multimedia equipped (CD-ROM, sound board, speakers).
   A. Yes
   B. No
   C. I do not know

_____

Section II
Planned Capabilities

_____

8. Within the next two to four years, I plan to upgrade my computer to (please circle only one).
   A. 486 microcomputer
   B. Pentium microcomputer
   C. Multimedia system
   D. Not planning to upgrade
   E. Other (Specify:_____)

9. How do you feel about information dissemination via computers (electronic) compared to hardcopy (paper). (Please circle only one)
   A. Strongly dislike
   B. dislike .
   C. no opinion
   D. like
   E. Strongly like

10. In my office, the biggest obstacle to implementing more advanced information technology (computers, multimedia, networks) are: (please rank 1 (greatest) through 6 (least)).
   _____ Access to hardware
   _____ Access to software
   _____ Training
   _____ Fear of computers
   _____ Access to online services
   _____ Funding

11. Please indicate the number of employees who work in your office. (please circle only one).
   A. Less than 10
   B. Between 10 and 30
   C. Between 31 and 50
   D. Greater than 50

Thank you for contributing to DBMU's
Survey on Automated Systems

Please return the completed survey in the enclosed preaddressed envelope.

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APPENDIX C. DATA GATHERED FROM DOD AND DFAS SURVEYS

	computer	opersys	lan	modem	ddn	internet	mmedia	upgrade	infodis	hardware	software	training	fear	accessol	funding	employee
1	4.00	2.00	2.00	1.00	1.00	2.00	2.00	1.00	5.00	5.00	4.00	2.00	6.00	3.00	1.00	2.00
2	3.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00	5.00	2.00	1.00	3.00	6.00	5.00	4.00	1.00
3	2.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	5.00	2.00	3.00	1.00	6.00	5.00	4.00	4.00
4	3.00	2.00	1.00	2.00	1.00	1.00	2.00	1.00	3.00	2.00	3.00	4.00	6.00	5.00	1.00	1.00
5	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	4.00
6	7.00	2.00	1.00	1.00	1.00	1.00	1.00	4.00	4.00	9.00	9.00	1.00	9.00	9.00	9.00	4.00
7	4.00	2.00	1.00	1.00	1.00	2.00	2.00	4.00	4.00	5.00	4.00	2.00	3.00	6.00	1.00	1.00
8	3.00	2.00	1.00	1.00	2.00	2.00	9.00	3.00	4.00	4.00	3.00	5.00	6.00	2.00	1.00	3.00
9	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00
10	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	2.00	3.00	5.00	4.00	6.00	1.00	4.00
11	4.00	2.00	2.00	1.00	1.00	3.00	2.00	4.00	4.00	6.00	5.00	1.00	3.00	4.00	2.00	3.00
12	4.00	2.00	2.00	1.00	1.00	2.00	1.00	1.00	4.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
13	4.00	2.00	2.00	1.00	1.00	3.00	2.00	4.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
14	4.00	2.00	2.00	1.00	3.00	3.00	2.00	4.00	4.00	3.00	2.00	5.00	6.00	4.00	1.00	4.00
15	4.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	5.00	3.00	6.00	2.00	4.00	5.00	1.00	2.00
16	4.00	2.00	2.00	1.00	2.00	2.00	2.00	3.00	4.00	3.00	2.00	4.00	6.00	5.00	1.00	4.00
17	3.00	2.00	2.00	1.00	1.00	2.00	2.00	5.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	2.00
18	4.00	2.00	2.00	2.00	2.00	2.00	2.00	4.00	5.00	4.00	5.00	3.00	6.00	1.00	2.00	2.00
19	4.00	2.00	2.00	1.00	1.00	2.00	2.00	3.00	4.00	5.00	4.00	3.00	6.00	1.00	2.00	2.00
20	4.00	2.00	1.00	2.00	1.00	1.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	3.00
21	4.00	2.00	1.00	1.00	1.00	3.00	2.00	3.00	5.00	3.00	2.00	4.00	6.00	5.00	1.00	4.00
22	4.00	2.00	1.00	1.00	2.00	1.00	2.00	4.00	4.00	9.00	9.00	9.00	9.00	9.00	1.00	3.00
23	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	5.00	1.00	2.00	3.00	5.00	6.00	4.00	3.00
24	2.00	1.00	2.00	1.00	1.00	1.00	2.00	4.00	5.00	4.00	2.00	3.00	6.00	5.00	1.00	4.00
25	2.00	1.00	1.00	2.00	3.00	3.00	2.00	1.00	4.00	4.00	5.00	3.00	6.00	2.00	1.00	4.00
26	4.00	2.00	2.00	1.00	1.00	2.00	2.00	4.00	4.00	6.00	5.00	1.00	2.00	3.00	4.00	2.00
27	4.00	2.00	2.00	1.00	1.00	1.00	2.00	2.00	4.00	4.00	5.00	2.00	6.00	3.00	1.00	4.00
28	4.00	2.00	1.00	2.00	1.00	1.00	2.00	4.00	4.00	3.00	4.00	5.00	6.00	2.00	1.00	4.00
29	3.00	1.00	1.00	1.00	2.00	1.00	2.00	1.00	4.00	3.00	2.00	5.00	6.00	4.00	1.00	2.00
30	4.00	1.00	2.00	1.00	1.00	1.00	2.00	4.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	3.00
31	4.00	2.00	2.00	1.00	1.00	2.00	2.00	4.00	4.00	2.00	4.00	5.00	6.00	3.00	1.00	1.00
32	7.00	2.00	1.00	1.00	2.00	1.00	2.00	4.00	4.00	1.00	3.00	5.00	6.00	2.00	4.00	1.00
33	4.00	2.00	2.00	1.00	1.00	1.00	2.00	2.00	5.00	6.00	5.00	3.00	1.00	4.00	2.00	3.00
34	3.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	5.00	2.00	3.00	5.00	0.00	4.00	1.00	4.00
35	2.00	1.00	1.00	1.00	1.00	3.00	2.00	1.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	4.00
36	3.00	1.00	1.00	1.00	2.00	2.00	2.00	4.00	4.00	5.00	4.00	3.00	6.00	2.00	1.00	4.00
37	4.00	2.00	2.00	1.00	1.00	1.00	2.00	4.00	4.00	3.00	4.00	5.00	6.00	2.00	1.00	3.00
38	4.00	2.00	1.00	1.00	3.00	3.00	2.00	3.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00

1-1

	computer	opersys	lan	modem	ddn	internet	mmedia	upgrade	infodis	hardware	software	training	fear	accessol	funding	employee
39	3.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	5.00	5.00	3.00	1.00	6.00	4.00	2.00	2.00
40	3.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00	5.00	9.00	1.00	2.00	9.00	9.00	3.00	4.00
41	3.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	4.00	1.00	2.00	6.00	4.00	5.00	3.00	2.00
42	4.00	2.00	2.00	2.00	2.00	2.00	2.00	4.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	3.00
43	4.00	2.00	1.00	2.00	1.00	9.00	2.00	4.00	4.00	5.00	4.00	3.00	2.00	6.00	1.00	1.00
44	4.00	2.00	2.00	2.00	1.00	3.00	2.00	3.00	5.00	6.00	5.00	1.00	3.00	4.00	2.00	3.00
45	4.00	2.00	1.00	2.00	1.00	3.00	1.00	4.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	1.00
46	7.00	4.00	1.00	1.00	3.00	3.00	2.00	4.00	2.00	3.00	4.00	2.00	6.00	5.00	1.00	1.00
47	4.00	2.00	2.00	2.00	1.00	3.00	2.00	4.00	3.00	6.00	5.00	1.00	4.00	3.00	2.00	2.00
48	3.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	5.00	3.00	4.00	1.00	5.00	6.00	2.00	4.00
49	4.00	1.00	1.00	1.00	1.00	2.00	2.00	9.00	4.00	6.00	1.00	2.00	5.00	3.00	4.00	4.00
50	2.00	1.00	1.00	1.00	2.00	2.00	2.00	4.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	1.00
51	4.00	2.00	1.00	1.00	1.00	2.00	1.00	2.00	4.00	9.00	9.00	1.00	9.00	9.00	9.00	1.00
52	3.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	4.00	5.00	2.00	4.00	6.00	1.00	3.00	1.00
53	4.00	2.00	1.00	1.00	3.00	3.00	2.00	4.00	4.00	9.00	9.00	1.00	9.00	9.00	9.00	2.00
54	3.00	1.00	1.00	1.00	3.00	1.00	2.00	1.00	4.00	1.00	3.00	4.00	5.00	6.00	2.00	2.00
55	4.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00	4.00	2.00	1.00	4.00	3.00	5.00	6.00	4.00
56	4.00	2.00	2.00	1.00	1.00	2.00	2.00	4.00	4.00	6.00	5.00	1.00	6.00	4.00	2.00	2.00
57	4.00	2.00	2.00	1.00	1.00	2.00	2.00	4.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	3.00
58	4.00	2.00	1.00	2.00	2.00	2.00	2.00	4.00	3.00	9.00	9.00	9.00	9.00	9.00	1.00	4.00
59	4.00	2.00	2.00	1.00	1.00	2.00	2.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
60	2.00	1.00	2.00	1.00	2.00	2.00	2.00	5.00	3.00	2.00	3.00	4.00	6.00	5.00	1.00	1.00
61	4.00	2.00	2.00	2.00	1.00	3.00	2.00	4.00	4.00	4.00	5.00	2.00	6.00	1.00	3.00	3.00
62	4.00	2.00	1.00	2.00	1.00	1.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	3.00
63	4.00	2.00	1.00	1.00	2.00	1.00	2.00	5.00	4.00	9.00	9.00	1.00	9.00	9.00	9.00	4.00
64	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	4.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
65	4.00	2.00	1.00	2.00	2.00	2.00	1.00	4.00	4.00	4.00	3.00	1.00	6.00	5.00	2.00	4.00
66	4.00	2.00	1.00	1.00	2.00	1.00	2.00	4.00	5.00	2.00	5.00	4.00	6.00	3.00	1.00	4.00
67	3.00	1.00	1.00	1.00	3.00	1.00	2.00	2.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	2.00
68	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	5.00	5.00	4.00	1.00	6.00	3.00	2.00	4.00
69	3.00	2.00	1.00	2.00	1.00	1.00	2.00	5.00	4.00	5.00	6.00	3.00	2.00	4.00	1.00	2.00
70	4.00	2.00	1.00	1.00	2.00	2.00	2.00	1.00	4.00	5.00	4.00	2.00	3.00	6.00	1.00	4.00
71	9.00	1.00	2.00	2.00	1.00	1.00	2.00	2.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	4.00
72	7.00	1.00	1.00	2.00	3.00	2.00	2.00	4.00	4.00	4.00	3.00	5.00	6.00	2.00	1.00	2.00
73	4.00	2.00	1.00	1.00	2.00	2.00	1.00	2.00	5.00	5.00	3.00	1.00	4.00	6.00	2.00	4.00
74	2.00	1.00	2.00	1.00	1.00	1.00	2.00	1.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00
75	4.00	2.00	1.00	2.00	1.00	1.00	2.00	3.00	4.00	4.00	5.00	3.00	2.00	6.00	1.00	4.00
76	1.00	2.00	1.00	1.00	1.00	2.00	2.00	3.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00

2-1

	computer	opersys	lan	modem	ddn	internet	mmedia	upgrade	infodis	hardware	software	training	fear	accessol	funding	employee
77	4.00	2.00	2.00	1.00	1.00	1.00	1.00	2.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
78	4.00	2.00	1.00	2.00	1.00	2.00	2.00	9.00	4.00	4.00	5.00	1.00	3.00	6.00	2.00	4.00
79	3.00	1.00	2.00	1.00	1.00	1.00	2.00	4.00	2.00	4.00	3.00	1.00	5.00	6.00	2.00	2.00
80	3.00	1.00	2.00	1.00	3.00	3.00	2.00	1.00	4.00	1.00	2.00	6.00	5.00	3.00	4.00	2.00
81	4.00	2.00	1.00	2.00	1.00	1.00	2.00	4.00	5.00	3.00	4.00	1.00	2.00	6.00	5.00	4.00
82	4.00	2.00	1.00	1.00	3.00	1.00	2.00	2.00	5.00	5.00	6.00	2.00	4.00	3.00	1.00	3.00
83	4.00	2.00	2.00	1.00	2.00	2.00	2.00	1.00	3.00	9.00	9.00	9.00	9.00	9.00	1.00	4.00
84	4.00	2.00	1.00	2.00	1.00	3.00	2.00	4.00	3.00	4.00	3.00	2.00	5.00	6.00	1.00	1.00
85	4.00	2.00	2.00	1.00	3.00	1.00	2.00	4.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	1.00
86	4.00	1.00	1.00	2.00	1.00	2.00	2.00	4.00	5.00	4.00	5.00	2.00	6.00	3.00	1.00	1.00
87	4.00	1.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	2.00	1.00	5.00	4.00	3.00	6.00	2.00
88	4.00	2.00	1.00	1.00	1.00	3.00	2.00	3.00	5.00	3.00	4.00	2.00	6.00	5.00	1.00	4.00
89	4.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	1.00
90	3.00	1.00	2.00	1.00	1.00	2.00	2.00	1.00	5.00	2.00	4.00	5.00	6.00	3.00	1.00	3.00
91	4.00	2.00	1.00	1.00	1.00	2.00	2.00	4.00	4.00	5.00	4.00	3.00	6.00	2.00	1.00	4.00
92	4.00	2.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	4.00	5.00	1.00	3.00	6.00	2.00	3.00
93	4.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	4.00
94	4.00	2.00	1.00	2.00	1.00	3.00	2.00	5.00	5.00	3.00	4.00	1.00	2.00	6.00	5.00	4.00
95	3.00	2.00	2.00	2.00	3.00	3.00	2.00	4.00	3.00	2.00	3.00	5.00	6.00	1.00	4.00	4.00
96	3.00	1.00	1.00	2.00	2.00	2.00	2.00	1.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00
97	4.00	2.00	2.00	1.00	1.00	1.00	2.00	2.00	4.00	5.00	4.00	3.00	6.00	1.00	2.00	4.00
98	4.00	1.00	1.00	2.00	3.00	3.00	2.00	3.00	5.00	6.00	3.00	1.00	2.00	4.00	5.00	1.00
99	3.00	1.00	2.00	1.00	2.00	2.00	2.00	4.00	1.00	4.00	3.00	1.00	5.00	2.00	6.00	2.00
100	4.00	2.00	1.00	1.00	1.00	2.00	2.00	4.00	4.00	4.00	3.00	2.00	6.00	5.00	1.00	4.00
101	2.00	2.00	1.00	2.00	1.00	2.00	2.00	5.00	4.00	4.00	2.00	5.00	6.00	3.00	1.00	4.00
102	4.00	2.00	2.00	1.00	1.00	2.00	2.00	3.00	5.00	4.00	5.00	2.00	1.00	6.00	3.00	3.00
103	3.00	1.00	1.00	2.00	1.00	3.00	2.00	4.00	4.00	4.00	3.00	2.00	6.00	5.00	1.00	4.00
104	4.00	2.00	2.00	1.00	1.00	2.00	2.00	5.00	4.00	2.00	1.00	3.00	6.00	5.00	4.00	4.00
105	3.00	2.00	2.00	1.00	1.00	2.00	2.00	3.00	4.00	3.00	4.00	2.00	5.00	6.00	1.00	4.00
106	2.00	1.00	1.00	2.00	2.00	2.00	2.00	1.00	1.00	5.00	3.00	4.00	6.00	2.00	1.00	2.00
107	4.00	2.00	1.00	2.00	2.00	2.00	2.00	4.00	5.00	3.00	4.00	5.00	6.00	1.00	2.00	1.00
108	7.00	1.00	2.00	1.00	1.00	1.00	2.00	1.00	4.00	2.00	4.00	5.00	6.00	3.00	1.00	2.00
109	3.00	1.00	1.00	1.00	3.00	3.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
110	4.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00	4.00	1.00	4.00	3.00	6.00	2.00	5.00	2.00
111	2.00	1.00	1.00	1.00	1.00	1.00	2.00	5.00	4.00	2.00	3.00	4.00	5.00	6.00	1.00	2.00
112	4.00	2.00	1.00	1.00	3.00	1.00	1.00	4.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	1.00
113	3.00	1.00	2.00	1.00	2.00	2.00	2.00	4.00	3.00	9.00	9.00	9.00	9.00	9.00	1.00	1.00
114	4.00	2.00	1.00	1.00	1.00	1.00	1.00	2.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	4.00

	computer	opersys	lan	modem	ddn	internet	mmedia	upgrade	infodis	hardware	software	training	fear	accessol	funding	employee
115	4.00	2.00	2.00	1.00	1.00	2.00	2.00	5.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00
116	4.00	1.00	1.00	1.00	1.00	3.00	2.00	1.00	4.00	2.00	4.00	3.00	6.00	5.00	1.00	4.00
117	4.00	2.00	2.00	2.00	1.00	2.00	2.00	4.00	4.00	2.00	3.00	4.00	5.00	6.00	1.00	4.00
118	4.00	2.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	1.00	2.00	3.00	4.00	6.00	5.00	4.00
119	3.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	4.00	1.00	2.00	4.00	6.00	5.00	3.00	2.00
120	2.00	1.00	2.00	1.00	1.00	1.00	2.00	1.00	4.00	9.00	9.00	5.00	9.00	9.00	9.00	4.00
121	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	1.00	2.00	3.00	6.00	5.00	4.00	2.00
122	3.00	1.00	2.00	1.00	1.00	3.00	2.00	1.00	3.00	6.00	5.00	2.00	3.00	4.00	1.00	4.00
123	3.00	1.00	2.00	1.00	3.00	3.00	2.00	1.00	4.00	5.00	6.00	3.00	1.00	4.00	2.00	3.00
124	4.00	2.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	4.00
125	7.00	1.00	1.00	1.00	2.00	2.00	2.00	4.00	4.00	5.00	2.00	4.00	6.00	3.00	1.00	2.00
126	3.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	3.00	2.00	3.00	5.00	6.00	4.00	1.00	4.00
127	4.00	2.00	1.00	1.00	9.00	9.00	2.00	4.00	4.00	6.00	5.00	2.00	4.00	3.00	1.00	3.00
128	3.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	4.00	3.00	2.00	6.00	5.00	2.00	4.00
129	3.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	4.00	9.00	2.00	1.00	9.00	3.00	1.00	1.00
130	4.00	2.00	1.00	2.00	2.00	1.00	2.00	3.00	5.00	4.00	6.00	3.00	1.00	5.00	2.00	2.00
131	4.00	1.00	1.00	2.00	1.00	3.00	2.00	4.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	1.00
132	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00	4.00	5.00	4.00	3.00	6.00	2.00	1.00	4.00
133	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
134	3.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	5.00	2.00	3.00	1.00	6.00	4.00	5.00	2.00
135	3.00	1.00	1.00	1.00	1.00	3.00	2.00	1.00	4.00	4.00	5.00	2.00	3.00	6.00	1.00	1.00
136	4.00	2.00	2.00	2.00	1.00	1.00	2.00	1.00	4.00	4.00	5.00	3.00	1.00	6.00	2.00	4.00
137	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
138	4.00	1.00	1.00	1.00	2.00	2.00	1.00	5.00	4.00	9.00	9.00	2.00	4.00	3.00	1.00	4.00
139	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	5.00	5.00	3.00	2.00	1.00	6.00	4.00	4.00
140	4.00	2.00	1.00	1.00	3.00	3.00	1.00	9.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
141	4.00	1.00	1.00	2.00	3.00	3.00	2.00	4.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	4.00
142	3.00	2.00	1.00	1.00	3.00	3.00	2.00	1.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
143	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00	4.00	3.00	4.00	5.00	6.00	2.00	1.00	4.00
144	3.00	2.00	2.00	1.00	2.00	2.00	2.00	1.00	5.00	4.00	2.00	5.00	6.00	3.00	1.00	1.00
145	4.00	2.00	1.00	1.00	2.00	1.00	1.00	5.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
146	3.00	2.00	2.00	2.00	1.00	2.00	1.00	4.00	4.00	4.00	3.00	1.00	6.00	2.00	1.00	1.00
147	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	4.00	4.00	5.00	1.00	6.00	3.00	1.00	2.00
148	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	3.00	9.00	9.00	1.00	9.00	9.00	9.00	3.00
149	2.00	1.00	1.00	1.00	2.00	2.00	2.00	5.00	4.00	1.00	4.00	2.00	6.00	3.00	5.00	2.00
150	3.00	1.00	2.00	2.00	2.00	2.00	2.00	1.00	4.00	9.00	9.00	9.00	9.00	9.00	9.00	4.00

	computer	opersys	lan	modem	ddn	internet	mmedia	upgrade	infodis	hardware	software	training	fcar	accessol	funding	employee
1	4.00	2.00	1.00	1.00	3.00	3.00	2.00	4.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	2.00
2	2.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	3.00
3	4.00	2.00	1.00	1.00	1.00	1.00	2.00	5.00	5.00	1.00	2.00	4.00	3.00	5.00	6.00	4.00
4	4.00	2.00	1.00	1.00	3.00	3.00	1.00	4.00	5.00	5.00	3.00	1.00	2.00	4.00	6.00	2.00
5	4.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	4.00
6	4.00	2.00	1.00	1.00	1.00	2.00	2.00	5.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
7	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	5.00	3.00	4.00	1.00	2.00	5.00	6.00	1.00
8	3.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	2.00
9	4.00	2.00	1.00	1.00	1.00	2.00	3.00	3.00	4.00	4.00	5.00	1.00	6.00	3.00	2.00	4.00
10	4.00	2.00	1.00	2.00	1.00	1.00	2.00	4.00	9.00	5.00	6.00	1.00	2.00	3.00	4.00	2.00
11	4.00	1.00	1.00	1.00	3.00	2.00	2.00	4.00	5.00	4.00	5.00	1.00	3.00	2.00	6.00	2.00
12	3.00	1.00	2.00	1.00	1.00	2.00	2.00	1.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
13	3.00	1.00	1.00	2.00	2.00	2.00	2.00	5.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
14	4.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	3.00
15	3.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	5.00	5.00	4.00	3.00	6.00	2.00	1.00	1.00
16	7.00	2.00	1.00	3.00	9.00	9.00	2.00	4.00	5.00	3.00	4.00	6.00	5.00	2.00	1.00	2.00
17	2.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
18	4.00	1.00	2.00	1.00	2.00	2.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	3.00
19	3.00	2.00	1.00	1.00	2.00	1.00	2.00	1.00	5.00	3.00	4.00	6.00	5.00	2.00	1.00	1.00
20	4.00	1.00	2.00	1.00	1.00	2.00	2.00	4.00	2.00	9.00	9.00	5.00	6.00	9.00	4.00	1.00
21	3.00	1.00	2.00	3.00	3.00	2.00	2.00	5.00	4.00	5.00	3.00	1.00	6.00	4.00	2.00	2.00
22	4.00	2.00	2.00	1.00	3.00	3.00	1.00	3.00	4.00	4.00	3.00	1.00	6.00	5.00	2.00	1.00
23	2.00	1.00	2.00	1.00	1.00	1.00	2.00	1.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00
24	4.00	2.00	2.00	1.00	2.00	2.00	2.00	4.00	5.00	4.00	3.00	1.00	5.00	6.00	2.00	1.00
25	6.00	5.00	1.00	1.00	1.00	1.00	1.00	5.00	5.00	3.00	4.00	2.00	5.00	6.00	1.00	2.00
26	4.00	2.00	1.00	1.00	1.00	2.00	2.00	5.00	5.00	1.00	2.00	4.00	6.00	5.00	3.00	3.00
27	3.00	2.00	1.00	1.00	3.00	2.00	2.00	4.00	5.00	3.00	4.00	2.00	6.00	5.00	1.00	1.00
28	4.00	2.00	2.00	1.00	2.00	2.00	2.00	4.00	2.00	4.00	3.00	2.00	6.00	5.00	1.00	2.00
29	3.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	5.00	3.00	4.00	1.00	6.00	5.00	2.00	1.00
30	2.00	1.00	2.00	1.00	2.00	2.00	2.00	4.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	1.00
31	4.00	1.00	2.00	1.00	1.00	3.00	2.00	3.00	2.00	2.00	4.00	3.00	6.00	5.00	1.00	3.00
32	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	6.00	5.00	3.00	2.00	4.00	1.00	4.00
33	2.00	1.00	2.00	1.00	3.00	2.00	2.00	4.00	5.00	3.00	2.00	5.00	6.00	5.00	2.00	2.00
34	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	4.00	4.00	3.00	2.00	6.00	5.00	1.00	2.00
35	4.00	2.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	9.00	9.00	3.00	9.00	2.00	1.00	1.00
36	3.00	1.00	1.00	1.00	1.00	3.00	2.00	5.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	2.00
37	4.00	2.00	1.00	1.00	2.00	2.00	2.00	2.00	4.00	3.00	6.00	1.00	5.00	4.00	2.00	4.00
38	4.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	3.00	9.00	9.00	9.00	9.00	9.00	1.00	1.00

	computer	opersys	lan	modem	ddm	internet	nmedia	upgrade	infodis	hardware	software	training	fear	accessol	finding	employee
39	3.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	3.00
40	3.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	4.00	2.00	4.00	1.00	5.00	6.00	3.00	1.00
41	4.00	2.00	1.00	1.00	1.00	2.00	2.00	3.00	4.00	6.00	5.00	1.00	3.00	4.00	2.00	4.00
42	3.00	2.00	2.00	2.00	2.00	1.00	2.00	2.00	4.00	5.00	6.00	1.00	4.00	3.00	2.00	2.00
43	4.00	1.00	2.00	1.00	3.00	1.00	2.00	3.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	2.00
44	4.00	2.00	1.00	2.00	2.00	2.00	2.00	4.00	2.00	4.00	5.00	3.00	2.00	6.00	1.00	2.00
45	3.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00	5.00	3.00	2.00	5.00	6.00	4.00	1.00	2.00
46	4.00	1.00	1.00	1.00	1.00	3.00	2.00	4.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	2.00
47	4.00	2.00	2.00	1.00	3.00	2.00	2.00	5.00	5.00	4.00	3.00	5.00	6.00	2.00	1.00	2.00
48	4.00	2.00	2.00	1.00	2.00	2.00	1.00	4.00	5.00	9.00	9.00	1.00	9.00	9.00	9.00	1.00
49	3.00	2.00	1.00	2.00	1.00	2.00	2.00	5.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
50	3.00	2.00	1.00	1.00	3.00	3.00	2.00	1.00	4.00	9.00	9.00	9.00	1.00	9.00	9.00	3.00
51	2.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	5.00	5.00	4.00	2.00	6.00	3.00	1.00	2.00
52	3.00	1.00	1.00	1.00	1.00	1.00	2.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	1.00
53	3.00	1.00	1.00	1.00	2.00	2.00	2.00	4.00	5.00	3.00	5.00	2.00	6.00	1.00	4.00	1.00
54	3.00	1.00	1.00	1.00	3.00	3.00	2.00	4.00	4.00	5.00	6.00	3.00	4.00	2.00	1.00	4.00
55	3.00	1.00	2.00	1.00	3.00	3.00	2.00	4.00	4.00	5.00	4.00	2.00	6.00	3.00	1.00	1.00
56	3.00	1.00	2.00	1.00	3.00	1.00	2.00	1.00	5.00	4.00	5.00	1.00	6.00	3.00	2.00	1.00
57	4.00	2.00	1.00	1.00	1.00	3.00	2.00	2.00	4.00	4.00	5.00	3.00	2.00	6.00	1.00	3.00
58	4.00	1.00	1.00	1.00	2.00	2.00	2.00	5.00	5.00	6.00	5.00	2.00	4.00	3.00	1.00	1.00
59	4.00	2.00	1.00	1.00	1.00	2.00	2.00	5.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
60	2.00	1.00	2.00	1.00	3.00	2.00	2.00	1.00	4.00	9.00	9.00	9.00	9.00	9.00	9.00	3.00
61	3.00	1.00	2.00	1.00	3.00	3.00	2.00	1.00	4.00	4.00	3.00	5.00	6.00	2.00	1.00	3.00
62	3.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	2.00
63	4.00	1.00	2.00	1.00	3.00	3.00	2.00	4.00	4.00	9.00	9.00	1.00	9.00	9.00	9.00	1.00
64	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	2.00
65	7.00	1.00	1.00	1.00	2.00	1.00	2.00	4.00	4.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
66	4.00	1.00	1.00	1.00	3.00	3.00	2.00	9.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	3.00
67	3.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	4.00	3.00	4.00	5.00	6.00	2.00	1.00	1.00
68	3.00	2.00	1.00	2.00	2.00	2.00	2.00	4.00	5.00	1.00	9.00	9.00	9.00	9.00	9.00	2.00
69	4.00	2.00	1.00	1.00	1.00	3.00	2.00	4.00	5.00	2.00	3.00	6.00	5.00	4.00	1.00	3.00
70	4.00	2.00	1.00	1.00	1.00	1.00	1.00	4.00	4.00	6.00	5.00	3.00	4.00	1.00	2.00	2.00
71	4.00	2.00	1.00	1.00	1.00	3.00	2.00	4.00	2.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
72	4.00	2.00	1.00	1.00	2.00	1.00	1.00	4.00	1.00	3.00	2.00	1.00	6.00	5.00	4.00	3.00
73	2.00	1.00	2.00	1.00	1.00	2.00	2.00	1.00	4.00	4.00	5.00	3.00	2.00	6.00	1.00	2.00
74	4.00	2.00	1.00	1.00	1.00	1.00	1.00	2.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00
75	4.00	1.00	2.00	1.00	1.00	2.00	2.00	5.00	5.00	1.00	2.00	4.00	6.00	5.00	3.00	2.00
76	3.00	2.00	2.00	1.00	3.00	2.00	2.00	1.00	4.00	1.00	4.00	3.00	6.00	5.00	2.00	1.00

	computer	opersys	lan	modem	ddn	internet	nmedia	upgrade	infodis	hardware	software	training	fear	accessol	funding	employee
77	4.00	2.00	1.00	1.00	3.00	3.00	2.00	4.00	4.00	4.00	5.00	3.00	6.00	2.00	1.00	2.00
78	4.00	5.00	2.00	1.00	2.00	2.00	2.00	3.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	1.00
79	4.00	1.00	3.00	1.00	3.00	3.00	1.00	4.00	3.00	5.00	4.00	1.00	2.00	6.00	3.00	1.00
80	4.00	2.00	1.00	1.00	3.00	3.00	1.00	2.00	4.00	5.00	6.00	2.00	3.00	4.00	1.00	1.00
81	3.00	1.00	1.00	1.00	2.00	2.00	2.00	9.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
82	3.00	1.00	1.00	2.00	2.00	2.00	2.00	1.00	4.00	4.00	3.00	1.00	6.00	5.00	2.00	2.00
83	4.00	2.00	1.00	1.00	3.00	3.00	2.00	3.00	4.00	3.00	2.00	1.00	6.00	5.00	4.00	2.00
84	4.00	2.00	1.00	1.00	1.00	2.00	2.00	9.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	1.00
85	4.00	2.00	1.00	2.00	2.00	2.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	4.00
86	9.00	1.00	3.00	1.00	3.00	3.00	9.00	9.00	4.00	9.00	9.00	9.00	9.00	9.00	9.00	1.00
87	3.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	5.00	5.00	6.00	3.00	4.00	2.00	1.00	4.00
88	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	4.00	5.00	4.00	2.00	1.00	3.00	6.00	1.00
89	4.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00	3.00	2.00	3.00	4.00	6.00	5.00	1.00	1.00
90	4.00	2.00	1.00	1.00	1.00	1.00	2.00	9.00	5.00	9.00	9.00	5.00	6.00	1.00	9.00	3.00
91	3.00	2.00	1.00	1.00	2.00	2.00	2.00	1.00	5.00	5.00	2.00	1.00	6.00	4.00	3.00	1.00
92	4.00	2.00	1.00	2.00	2.00	2.00	2.00	1.00	5.00	4.00	5.00	3.00	1.00	2.00	6.00	1.00
93	3.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	3.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
94	4.00	2.00	2.00	1.00	3.00	2.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
95	4.00	2.00	2.00	1.00	2.00	2.00	2.00	4.00	4.00	6.00	5.00	2.00	3.00	4.00	1.00	1.00
96	3.00	1.00	2.00	1.00	1.00	1.00	2.00	4.00	5.00	2.00	3.00	4.00	5.00	6.00	1.00	4.00
97	7.00	2.00	1.00	1.00	1.00	2.00	1.00	9.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	3.00
98	4.00	2.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	4.00	3.00	5.00	6.00	2.00	1.00	4.00
99	3.00	2.00	1.00	1.00	1.00	1.00	2.00	5.00	4.00	2.00	3.00	6.00	5.00	4.00	1.00	3.00
100	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	5.00	5.00	3.00	4.00	6.00	2.00	1.00	3.00
101	4.00	2.00	2.00	1.00	3.00	2.00	2.00	9.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	1.00
102	4.00	2.00	1.00	1.00	1.00	1.00	1.00	2.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	2.00
103	4.00	1.00	2.00	1.00	1.00	1.00	1.00	3.00	4.00	4.00	3.00	1.00	5.00	6.00	2.00	4.00
104	4.00	2.00	1.00	3.00	1.00	3.00	2.00	3.00	5.00	6.00	5.00	4.00	3.00	1.00	2.00	3.00
105	2.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	2.00
106	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	3.00	6.00	5.00	1.00	2.00	3.00	4.00	1.00
107	3.00	1.00	1.00	1.00	2.00	1.00	2.00	1.00	5.00	4.00	5.00	1.00	6.00	3.00	2.00	2.00
108	3.00	1.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	4.00	5.00	3.00	2.00	6.00	1.00	1.00
109	3.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	5.00	3.00	4.00	1.00	5.00	6.00	2.00	1.00
110	3.00	1.00	1.00	1.00	3.00	3.00	3.00	1.00	4.00	2.00	4.00	3.00	6.00	5.00	1.00	3.00
111	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	5.00	5.00	4.00	3.00	6.00	2.00	1.00	1.00
112	3.00	1.00	2.00	2.00	2.00	2.00	2.00	4.00	3.00	9.00	9.00	9.00	9.00	9.00	9.00	1.00
113	3.00	1.00	2.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	3.00	4.00	5.00	6.00	1.00	1.00
114	4.00	2.00	1.00	1.00	2.00	1.00	2.00	3.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00

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	computer	opersys	lan	modem	ddn	internet	mmedia	upgrade	infodis	hardware	software	training	fear	accessol	funding	employee
115	3.00	1.00	2.00	2.00	2.00	2.00	2.00	4.00	5.00	4.00	5.00	3.00	6.00	2.00	1.00	1.00
116	4.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.00	5.00	6.00	3.00	4.00	2.00	1.00	4.00
117	4.00	2.00	2.00	2.00	1.00	2.00	2.00	4.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
118	4.00	2.00	1.00	1.00	2.00	2.00	2.00	1.00	4.00	4.00	2.00	5.00	0.00	3.00	1.00	2.00
119	3.00	2.00	1.00	1.00	3.00	1.00	2.00	1.00	4.00	4.00	5.00	2.00	6.00	3.00	1.00	2.00
120	4.00	2.00	2.00	1.00	2.00	1.00	2.00	4.00	5.00	5.00	4.00	2.00	6.00	3.00	1.00	2.00
121	4.00	1.00	1.00	1.00	1.00	3.00	2.00	4.00	3.00	5.00	4.00	2.00	6.00	3.00	1.00	3.00
122	4.00	2.00	1.00	1.00	3.00	1.00	2.00	4.00	3.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
123	3.00	2.00	1.00	1.00	2.00	2.00	2.00	1.00	5.00	9.00	9.00	9.00	9.00	1.00	9.00	4.00
124	3.00	1.00	1.00	1.00	3.00	3.00	2.00	4.00	4.00	3.00	2.00	5.00	6.00	4.00	1.00	1.00
125	4.00	2.00	1.00	1.00	1.00	1.00	2.00	5.00	5.00	6.00	3.00	1.00	2.00	4.00	5.00	2.00
126	3.00	1.00	2.00	1.00	2.00	1.00	2.00	4.00	3.00	3.00	4.00	5.00	6.00	2.00	1.00	1.00
127	4.00	2.00	1.00	2.00	2.00	2.00	2.00	2.00	5.00	3.00	4.00	1.00	6.00	5.00	2.00	2.00
128	3.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	1.00
129	3.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00	4.00	4.00	3.00	5.00	6.00	2.00	1.00	4.00
130	3.00	1.00	2.00	1.00	2.00	2.00	2.00	4.00	4.00	9.00	9.00	9.00	9.00	9.00	1.00	2.00
131	3.00	1.00	2.00	1.00	3.00	3.00	2.00	4.00	5.00	4.00	5.00	1.00	6.00	3.00	2.00	1.00
132	4.00	2.00	1.00	2.00	2.00	2.00	2.00	5.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
133	2.00	1.00	2.00	1.00	3.00	3.00	2.00	4.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	1.00
134	4.00	2.00	1.00	1.00	2.00	2.00	2.00	1.00	5.00	3.00	4.00	1.00	6.00	2.00	5.00	2.00
135	4.00	2.00	1.00	1.00	1.00	2.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	3.00
136	4.00	2.00	2.00	1.00	2.00	2.00	2.00	4.00	5.00	9.00	9.00	1.00	9.00	9.00	9.00	1.00
137	4.00	1.00	2.00	1.00	3.00	3.00	2.00	4.00	3.00	3.00	4.00	5.00	6.00	2.00	1.00	3.00
138	4.00	2.00	2.00	1.00	1.00	1.00	2.00	3.00	2.00	4.00	3.00	5.00	6.00	2.00	1.00	4.00
139	3.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	3.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
140	3.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	4.00	5.00	4.00	2.00	1.00	3.00	6.00	2.00
141	4.00	1.00	2.00	1.00	3.00	3.00	1.00	5.00	4.00	4.00	3.00	2.00	6.00	5.00	1.00	1.00
142	4.00	2.00	2.00	1.00	2.00	2.00	2.00	4.00	3.00	5.00	3.00	3.00	6.00	2.00	1.00	1.00
143	4.00	2.00	1.00	1.00	1.00	2.00	3.00	5.00	5.00	4.00	5.00	1.00	6.00	3.00	2.00	2.00
144	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	4.00	4.00	3.00	5.00	6.00	2.00	1.00	1.00
145	2.00	1.00	2.00	1.00	1.00	2.00	2.00	1.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	1.00
146	3.00	2.00	1.00	1.00	3.00	1.00	2.00	1.00	5.00	3.00	4.00	2.00	5.00	6.00	1.00	4.00
147	4.00	2.00	1.00	1.00	2.00	1.00	2.00	4.00	4.00	5.00	4.00	1.00	6.00	2.00	3.00	2.00
148	4.00	1.00	2.00	2.00	2.00	2.00	2.00	1.00	4.00	9.00	9.00	1.00	9.00	9.00	9.00	1.00
149	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	4.00	4.00	5.00	2.00	6.00	1.00	3.00	2.00
150	7.00	1.00	2.00	1.00	1.00	3.00	1.00	1.00	4.00	3.00	4.00	1.00	0.00	5.00	2.00	1.00
151	4.00	1.00	1.00	1.00	1.00	1.00	2.00	3.00	4.00	3.00	4.00	2.00	6.00	5.00	1.00	2.00
152	4.00	1.00	1.00	1.00	2.00	2.00	2.00	4.00	5.00	5.00	4.00	3.00	6.00	2.00	1.00	4.00

	computer	opersys	lan	modem	ddn	internet	numedia	upgrade	infodis	hardware	software	training	fear	accesssol	funding	employee
153	4.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	5.00	5.00	4.00	2.00	6.00	3.00	1.00	2.00
154	4.00	2.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	2.00	3.00	4.00	6.00	5.00	1.00	4.00
155	7.00	1.00	2.00	2.00	2.00	2.00	2.00	4.00	5.00	3.00	4.00	5.00	6.00	1.00	2.00	1.00
156	4.00	1.00	2.00	1.00	1.00	2.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
157	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	3.00	2.00	4.00	6.00	5.00	1.00	4.00
158	4.00	2.00	2.00	1.00	3.00	1.00	2.00	5.00	4.00	6.00	4.00	1.00	2.00	3.00	5.00	1.00
159	4.00	2.00	1.00	1.00	1.00	2.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	9.00	2.00
160	3.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	5.00	2.00	4.00	5.00	6.00	3.00	1.00	2.00
161	4.00	1.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	5.00	4.00	2.00	3.00	6.00	1.00	2.00
162	4.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	1.00
163	4.00	2.00	1.00	1.00	2.00	2.00	2.00	4.00	2.00	2.00	3.00	4.00	6.00	1.00	5.00	3.00
164	3.00	2.00	2.00	1.00	1.00	3.00	2.00	4.00	4.00	5.00	3.00	4.00	6.00	1.00	2.00	2.00
165	3.00	2.00	1.00	1.00	1.00	3.00	2.00	2.00	5.00	3.00	2.00	5.00	6.00	4.00	1.00	2.00
166	4.00	2.00	1.00	1.00	3.00	1.00	2.00	4.00	5.00	6.00	4.00	1.00	3.00	2.00	5.00	2.00
167	4.00	2.00	2.00	1.00	1.00	1.00	1.00	5.00	4.00	3.00	4.00	1.00	6.00	5.00	2.00	2.00
168	4.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	4.00	9.00	9.00	9.00	9.00	9.00	9.00	4.00
169	4.00	2.00	2.00	1.00	2.00	2.00	2.00	4.00	5.00	5.00	1.00	3.00	2.00	4.00	6.00	3.00
170	4.00	1.00	1.00	1.00	1.00	3.00	3.00	4.00	4.00	5.00	3.00	2.00	1.00	4.00	6.00	2.00
171	4.00	1.00	2.00	1.00	3.00	3.00	1.00	4.00	3.00	9.00	9.00	9.00	9.00	9.00	1.00	1.00
172	3.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	3.00	1.00	2.00	3.00	4.00	6.00	5.00	4.00
173	3.00	2.00	1.00	1.00	1.00	2.00	2.00	1.00	5.00	4.00	3.00	2.00	6.00	5.00	1.00	4.00
174	4.00	2.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	4.00	3.00	1.00	6.00	2.00	5.00	1.00
175	4.00	2.00	1.00	1.00	2.00	1.00	2.00	3.00	5.00	9.00	9.00	9.00	1.00	9.00	9.00	1.00
176	7.00	5.00	1.00	2.00	2.00	2.00	2.00	1.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
177	3.00	1.00	2.00	2.00	2.00	2.00	2.00	1.00	3.00	4.00	1.00	2.00	6.00	5.00	3.00	1.00
178	3.00	2.00	1.00	2.00	9.00	2.00	2.00	1.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	1.00
179	4.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	5.00	4.00	5.00	3.00	6.00	2.00	1.00	2.00
180	2.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	5.00	4.00	5.00	1.00	2.00	3.00	6.00	2.00
181	3.00	2.00	1.00	2.00	2.00	3.00	2.00	1.00	4.00	2.00	3.00	4.00	6.00	5.00	1.00	2.00
182	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	4.00	4.00	3.00	2.00	6.00	5.00	1.00	2.00
183	4.00	2.00	1.00	1.00	1.00	1.00	2.00	4.00	5.00	9.00	9.00	9.00	9.00	9.00	1.00	4.00
184	4.00	2.00	1.00	1.00	3.00	3.00	2.00	5.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
185	3.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	4.00	2.00	3.00	5.00	6.00	4.00	1.00	2.00
186	4.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	2.00	4.00	5.00	6.00	1.00	3.00
187	7.00	5.00	1.00	1.00	2.00	2.00	2.00	2.00	5.00	1.00	2.00	4.00	6.00	3.00	5.00	2.00
188	4.00	2.00	1.00	1.00	2.00	2.00	2.00	3.00	4.00	4.00	5.00	2.00	3.00	6.00	1.00	2.00
189	3.00	2.00	1.00	1.00	2.00	2.00	2.00	3.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	4.00
190	2.00	1.00	1.00	1.00	3.00	2.00	2.00	4.00	4.00	9.00	9.00	9.00	9.00	9.00	1.00	3.00

	computer	opersys	lan	modem	ddn	internet	mmedia	upgrade	infodis	hardware	software	training	fear	accessol	fundng	employee
191	3.00	2.00	1.00	2.00	1.00	1.00	2.00	1.00	5.00	2.00	3.00	6.00	5.00	4.00	1.00	1.00
192	4.00	2.00	1.00	2.00	2.00	2.00	2.00	4.00	4.00	6.00	5.00	2.00	3.00	4.00	1.00	2.00
193	4.00	2.00	1.00	1.00	1.00	1.00	2.00	3.00	5.00	4.00	5.00	1.00	6.00	2.00	3.00	3.00
194	4.00	2.00	1.00	1.00	2.00	1.00	2.00	4.00	5.00	5.00	6.00	1.00	2.00	3.00	4.00	2.00
195	4.00	4.00	1.00	1.00	1.00	1.00	2.00	4.00	5.00	2.00	3.00	1.00	6.00	4.00	5.00	1.00
196	3.00	2.00	2.00	1.00	3.00	3.00	9.00	3.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	3.00
197	3.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	5.00	4.00	3.00	5.00	6.00	2.00	1.00	2.00
198	3.00	2.00	1.00	1.00	1.00	9.00	2.00	2.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	3.00
199	2.00	1.00	2.00	1.00	2.00	2.00	2.00	5.00	5.00	2.00	3.00	5.00	6.00	4.00	1.00	4.00
200	4.00	2.00	1.00	1.00	1.00	3.00	2.00	5.00	5.00	3.00	4.00	5.00	6.00	2.00	1.00	2.00
201	3.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	5.00	3.00	1.00	6.00	5.00	2.00	4.00	2.00
202	3.00	2.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	3.00	4.00	2.00	6.00	5.00	1.00	2.00
203	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	2.00	2.00	4.00	5.00	6.00	3.00	1.00	2.00
204	4.00	2.00	1.00	1.00	1.00	3.00	2.00	5.00	3.00	3.00	2.00	5.00	6.00	4.00	1.00	1.00
205	4.00	2.00	1.00	1.00	3.00	2.00	2.00	5.00	4.00	2.00	6.00	5.00	4.00	3.00	1.00	2.00
206	3.00	2.00	1.00	3.00	3.00	3.00	2.00	1.00	5.00	5.00	4.00	2.00	6.00	1.00	3.00	2.00

APPENDIX D. DESCRIPTIVE ANALYSIS ON SURVEY DATA
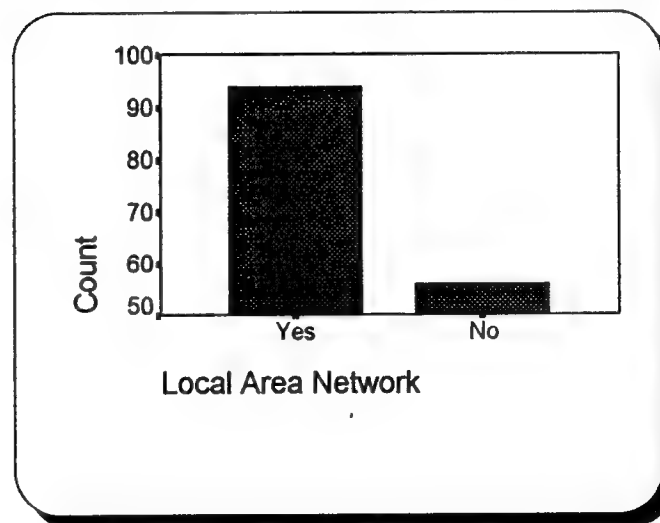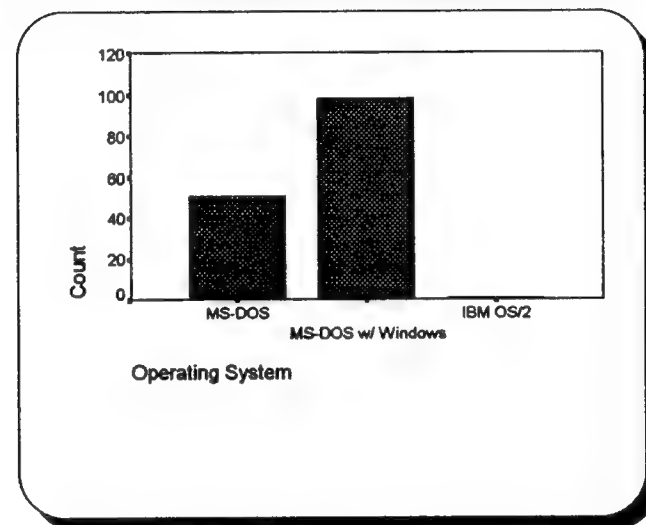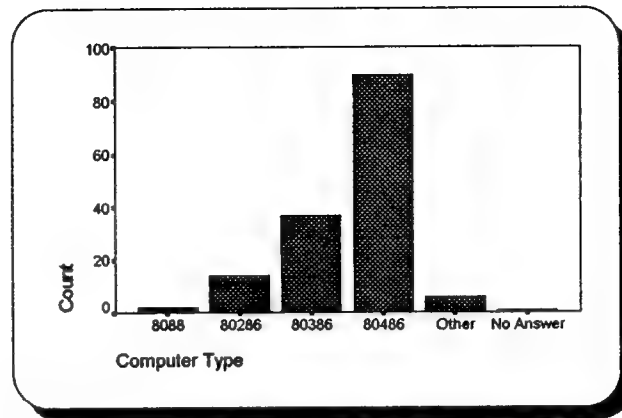
DBMU SURVEY: DFAS STUDY

COMPUTER   Computer Type

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	2	1.3	1.3	1.3
	2.00	14	9.3	9.3	10.7
	3.00	37	24.7	24.7	35.3
	4.00	90	60.0	60.0	95.3
	7.00	6	4.0	4.0	99.3
	9.00	1	.7	.7	100.0
		-------	-------	-------	
	Total	150	100.0	100.0	

Mean	3.680	Median	4.000	Mode	4.000
Std dev	1.083	Variance	1.172	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

OPERSYS   Operating System

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	51	34.0	34.0	34.0
	2.00	98	65.3	65.3	99.3
	4.00	1	.7	.7	100.0
		-------	-------	-------	
	Total	150	100.0	100.0	

Mean	1.673	Median	2.000	Mode	2.000
Std dev	.512	Variance	.262	Range	3.000
Minimum	1.000	Maximum	4.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

LAN   Local Area Network

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	94	62.7	62.7	62.7
	2.00	56	37.3	37.3	100.0
		-------	-------	-------	
	Total	150	100.0	100.0	

Mean	1.373	Median	1.000	Mode	1.000
Std dev	.485	Variance	.236	Range	1.000
Minimum	1.000	Maximum	2.000		

Valid cases   150   Missing cases   0

Histogram

Std. Dev = 1.08
Mean = 3.7
N = 150.00

Computer Type

Histogram

Std. Dev = .51
Mean = 1.7
N = 150.00

Operating System

Histogram

Std. Dev = .49
Mean = 1.37
N = 150.00

Local Area Network

Computer has Modem

DDN Access

Internet Access (other than DDN)
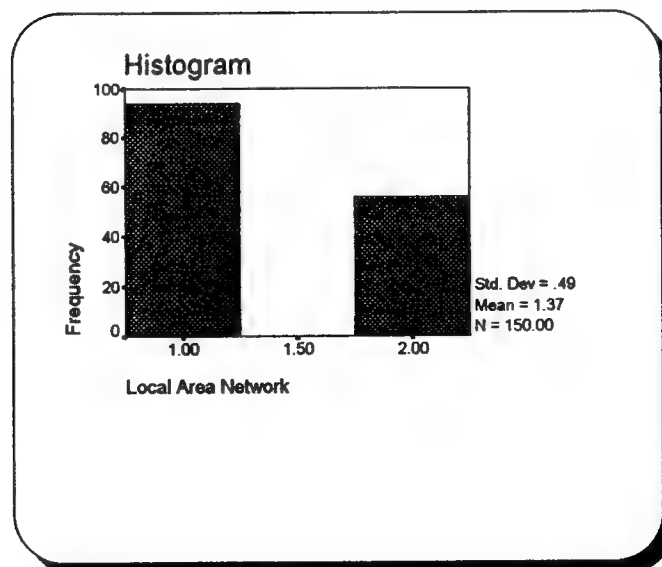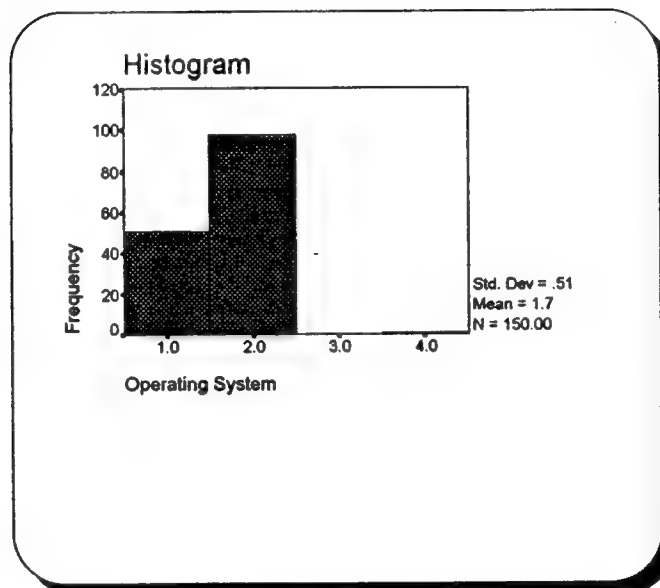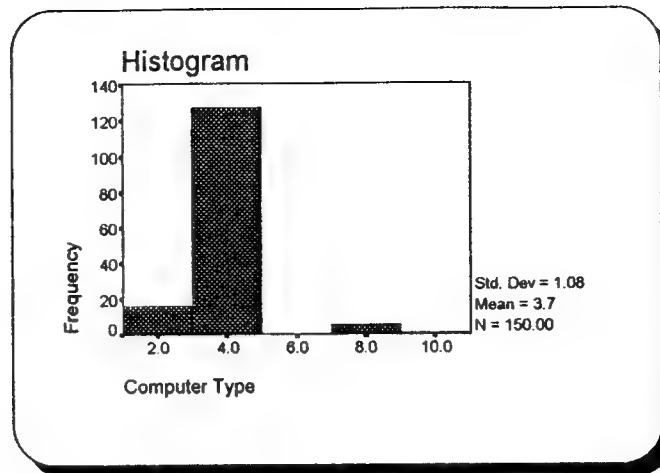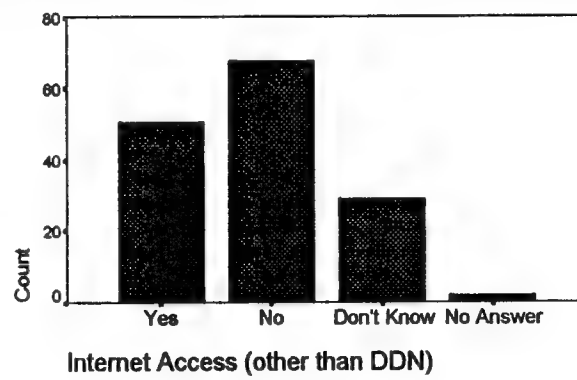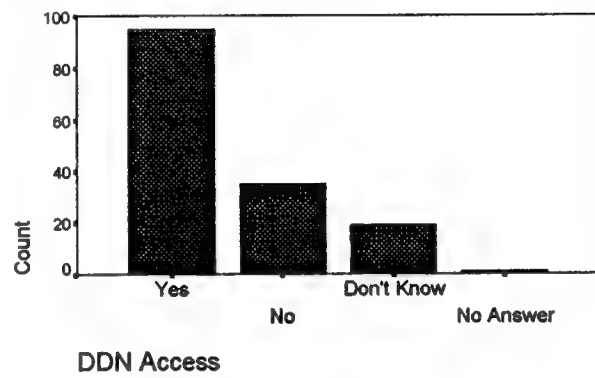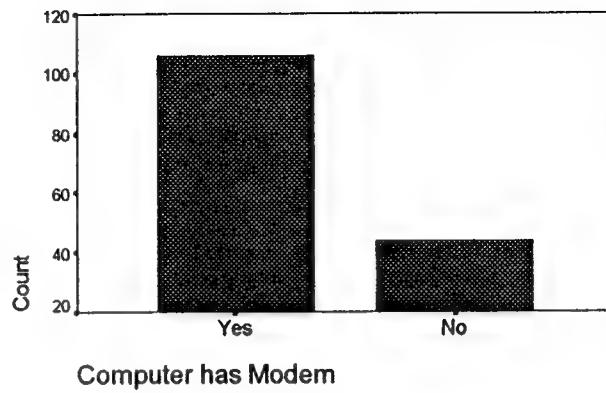
DBMU Survey: DFAS Study

MODEM   Modem

				Valid	Cum
Value Label	Value	Frequency	Percent	Percent	Percent
	1.00	106	70.7	70.7	70.7
	2.00	44	29.3	29.3	100.0
	Total	150	100.0	100.0	

Mean	1.293	Median	1.000	Mode	1.000
Std dev	.457	Variance	.209	Range	1.000
Minimum	1.000	Maximum	2.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

DDN   DDN Access

				Valid	Cum
Value Label	Value	Frequency	Percent	Percent	Percent
	1.00	95	63.3	63.3	63.3
	2.00	35	23.3	23.3	86.7
	3.00	19	12.7	12.7	99.3
	9.00	1	.7	.7	100.0
	Total	150	100.0	100.0	

Mean	1.540	Median	1.000	Mode	1.000
Std dev	.939	Variance	.881	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0
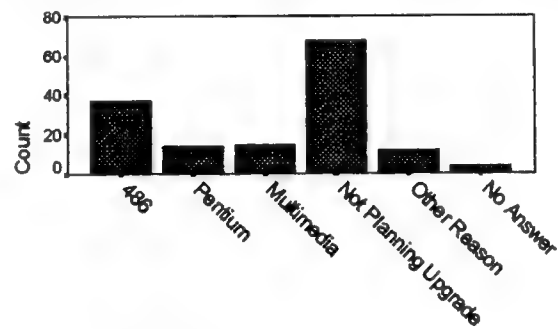
DBMU Survey: DFAS Study

INTERNET Internet Access

				Valid	Cum
Value Label	Value	Frequency	Percent	Percent	Percent
	1.00	51	34.0	34.0	34.0
	2.00	68	45.3	45.3	79.3
	3.00	29	19.3	19.3	98.7
	9.00	2	1.3	1.3	100.0
	Total	150	100.0	100.0	

Mean	1.947	Median	2.000	Mode	2.000
Std dev	1.092	Variance	1.192	Range	8.000
Minimum	1.000	Maximum	9.000		
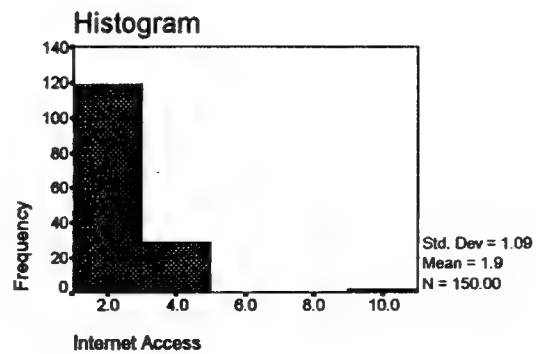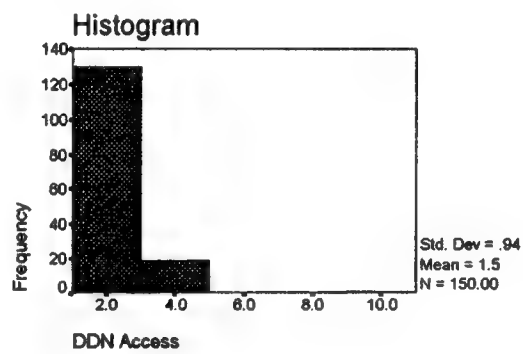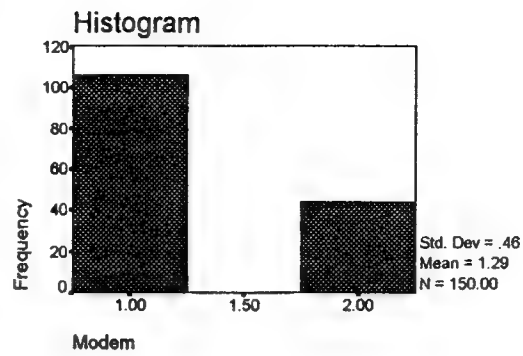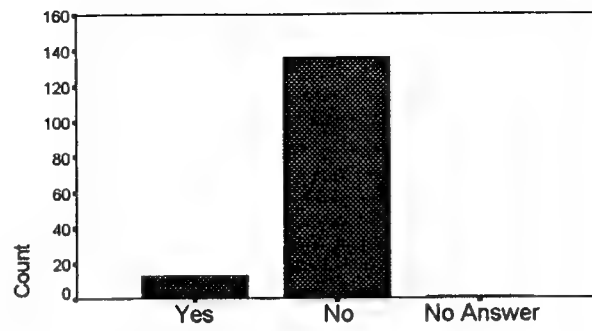
Valid cases   150   Missing cases   0

Histogram

Std. Dev = .46
Mean = 1.29
N = 150.00

Modem

Histogram

Std. Dev = .94
Mean = 1.5
N = 150.00

DDN Access

Histogram

Std. Dev = 1.09
Mean = 1.9
N = 150.00

Internet Access
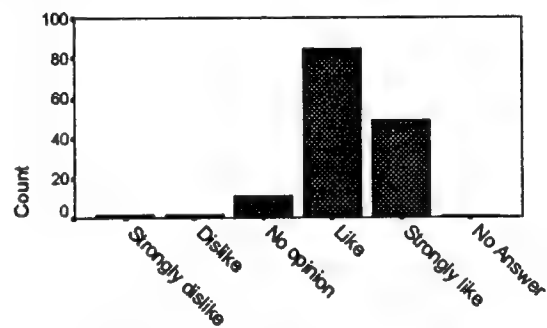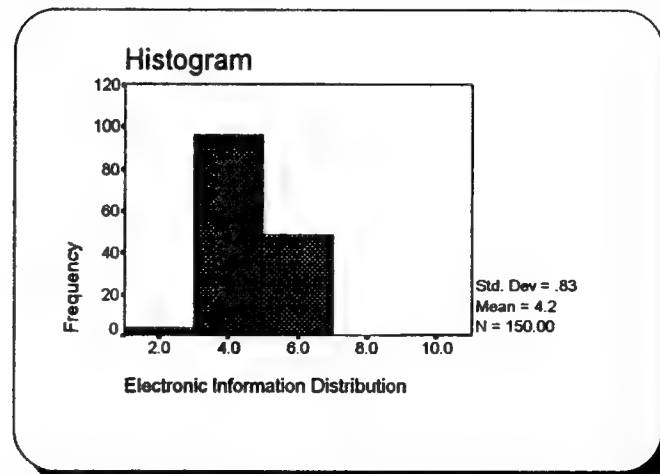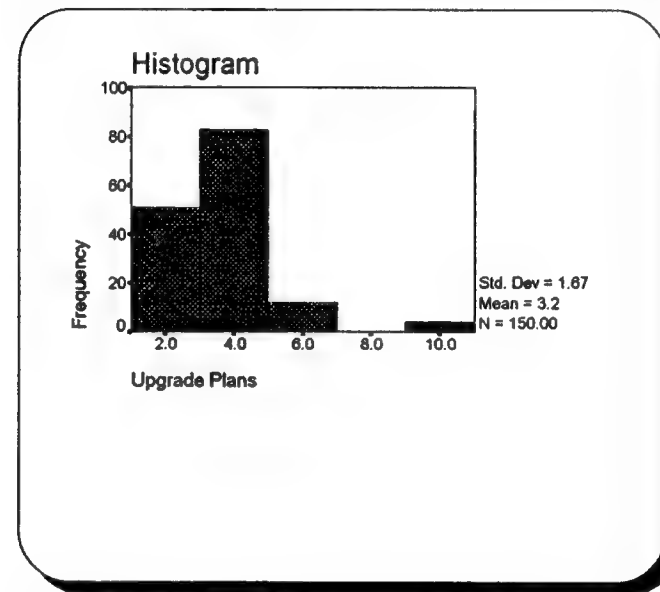
Multimedia Capable

Upgrade Plans

Electronic Information Distribution

MMEDIA   Multimedia Capable

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	13	8.7	8.7	8.7
	2.00	136	90.7	90.7	99.3
	9.00	1	.7	.7	100.0
	Total	150	100.0	100.0	

Mean	1.960	Median	2.000	Mode	2.000
Std dev	.644	Variance	.414	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

UPGRADE   Upgrade Plans

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	37	24.7	24.7	24.7
	2.00	14	9.3	9.3	34.0
	3.00	15	10.0	10.0	44.0
	4.00	68	45.3	45.3	89.3
	5.00	12	8.0	8.0	97.3
	9.00	4	2.7	2.7	100.0
	Total	150	100.0	100.0	

Mean	3.187	Median	4.000	Mode	4.000
Std dev	1.672	Variance	2.797	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

INFODIS   Electronic Information Distribution

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	2	1.3	1.3	1.3
	2.00	2	1.3	1.3	2.7
	3.00	11	7.3	7.3	10.0
	4.00	85	56.7	56.7	66.7
	5.00	49	32.7	32.7	99.3
	9.00	1	.7	.7	100.0
	Total	150	100.0	100.0	

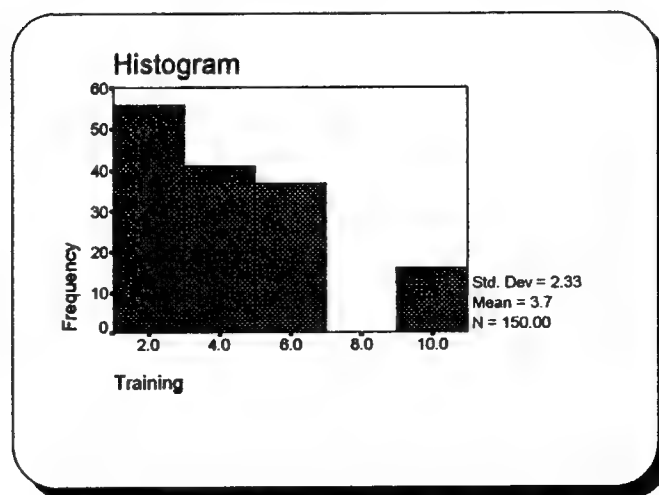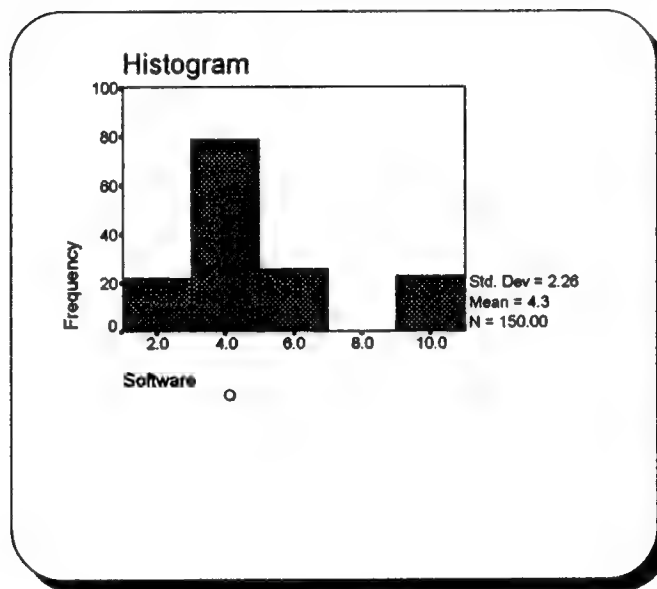|					
Mean	4.220	Median	4.000	Mode	4.000
Std dev	.834	Variance	.696	Range	8.000
Minimum	1.000	Maximum	9.000		
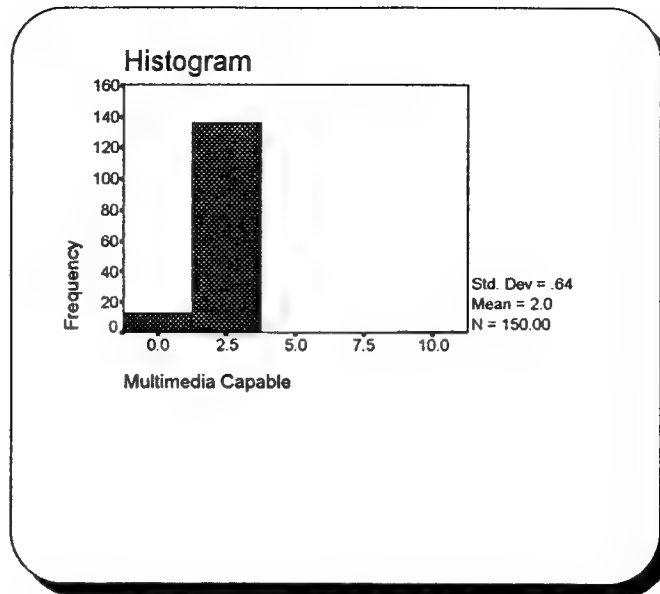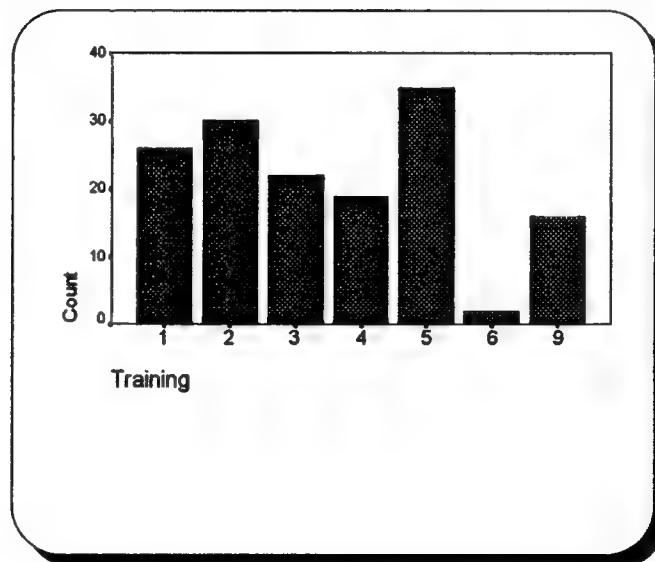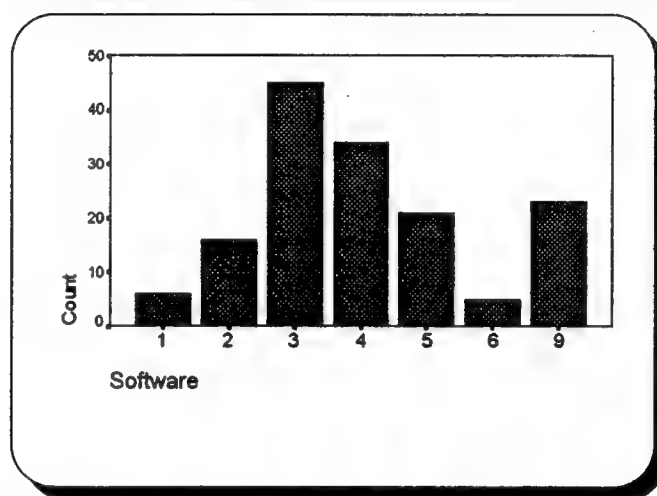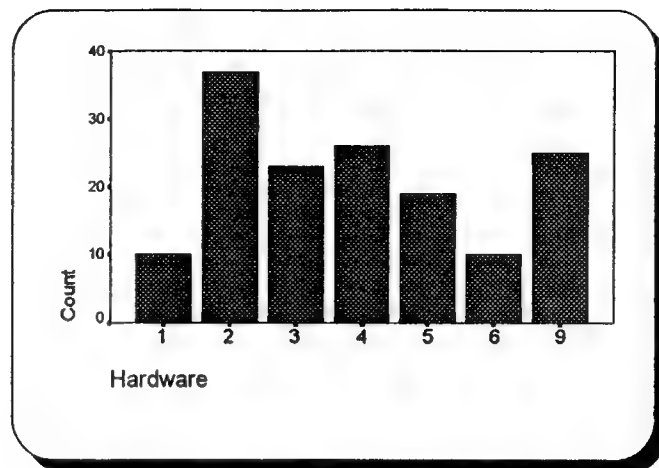
Valid cases   150   Missing cases   0

143

Histogram — Multimedia Capable
Std. Dev = .64
Mean = 2.0
N = 150.00

Histogram — Upgrade Plans
Std. Dev = 1.67
Mean = 3.2
N = 150.00

Histogram — Electronic Information Distribution
Std. Dev = .83
Mean = 4.2
N = 150.00

Hardware

Software

Training

145

HARDWARE Hardware

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	10	6.7	6.7	6.7
	2.00	37	24.7	24.7	31.3
	3.00	23	15.3	15.3	46.7
	4.00	26	17.3	17.3	64.0
	5.00	19	12.7	12.7	76.7
	6.00	10	6.7	6.7	83.3
	9.00	25	16.7	16.7	100.0
	Total	150	100.0	100.0	

Mean	4.247	Median	4.000	Mode	2.000
Std dev	2.506	Variance	6.281	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

SOFTWARE Software

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	6	4.0	4.0	4.0
	2.00	16	10.7	10.7	14.7
	3.00	45	30.0	30.0	44.7
	4.00	34	22.7	22.7	67.3
	5.00	21	14.0	14.0	81.3
	6.00	5	3.3	3.3	84.7
	9.00	23	15.3	15.3	100.0
	Total	150	100.0	100.0	

Mean	4.340	Median	4.000	Mode	3.000
Std dev	2.261	Variance	5.112	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

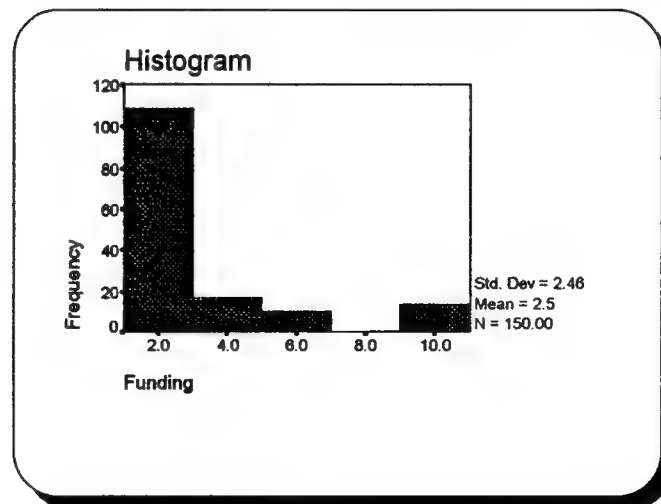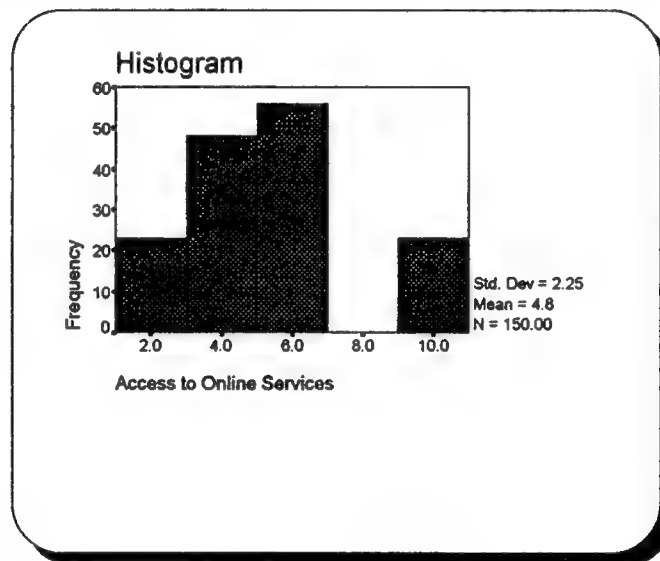DBMU Survey: DFAS Study

TRAINING Training

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	26	17.3	17.3	17.3
	2.00	30	20.0	20.0	37.3
	3.00	22	14.7	14.7	52.0
	4.00	19	12.7	12.7	64.7
	5.00	35	23.3	23.3	88.0
	6.00	2	1.3	1.3	89.3
	9.00	16	10.7	10.7	100.0
	Total	150	100.0	100.0	

Mean	3.727	Median	3.000	Mode	5.000
Std dev	2.328	Variance	5.421	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

146

Histogram

Hardware

Std. Dev = 2.51
Mean = 4.2
N = 150.00

Histogram

Software

Std. Dev = 2.26
Mean = 4.3
N = 150.00

Histogram

Training

Std. Dev = 2.33
Mean = 3.7
N = 150.00

147

148
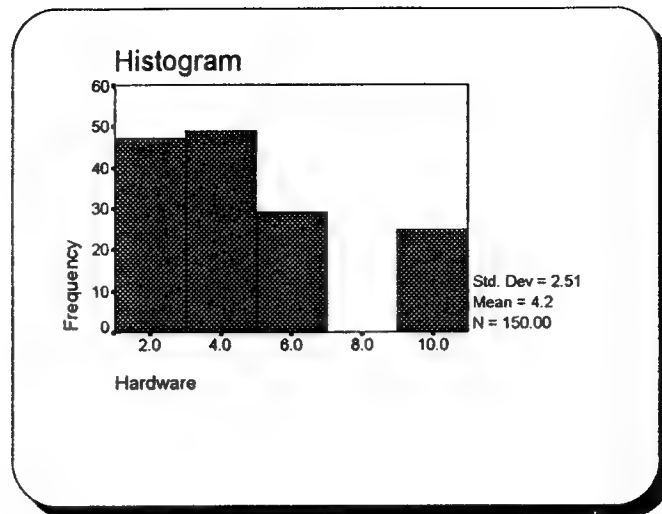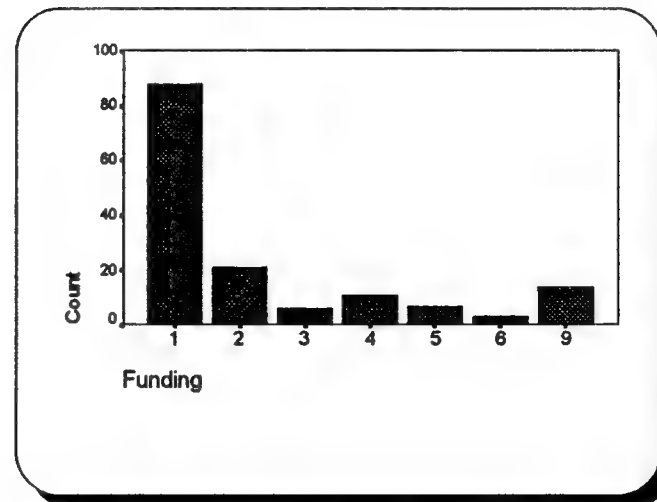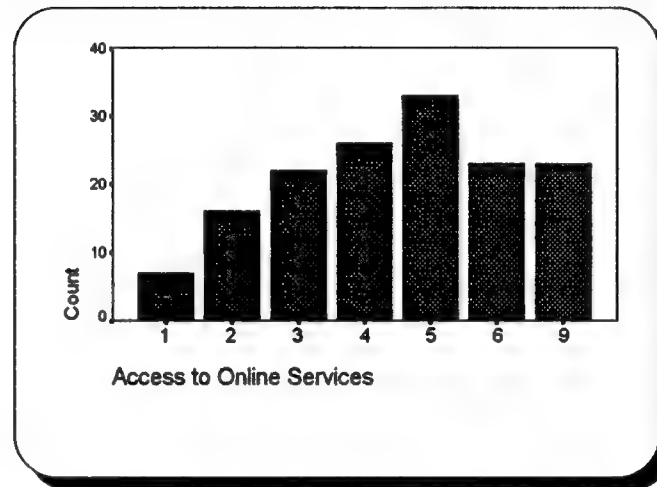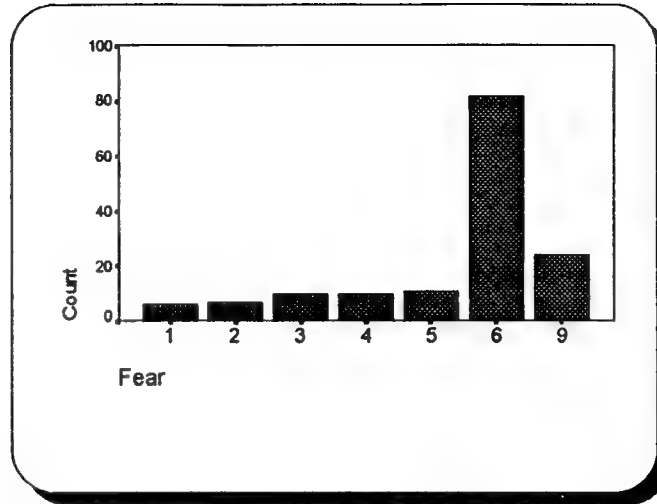
FEAR   Fear

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	6	4.0	4.0	4.0
	2.00	7	4.7	4.7	8.7
	3.00	10	6.7	6.7	15.3
	4.00	10	6.7	6.7	22.0
	5.00	11	7.3	7.3	29.3
	6.00	82	54.7	54.7	84.0
	9.00	24	16.0	16.0	100.0
	Total	150	100.0	100.0	

Mean	5.687	Median	6.000	Mode	6.000
Std dev	2.014	Variance	4.056	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

ACCESSOL   Access to Online Services

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	7	4.7	4.7	4.7
	2.00	16	10.7	10.7	15.3
	3.00	22	14.7	14.7	30.0
	4.00	26	17.3	17.3	47.3
	5.00	33	22.0	22.0	69.3
	6.00	23	15.3	15.3	84.7
	9.00	23	15.3	15.3	100.0
	Total	150	100.0	100.0	

Mean	4.793	Median	5.000	Mode	5.000
Std dev	2.250	Variance	5.064	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   150   Missing cases   0

DBMU Survey: DFAS Study

FUNDING   Funding

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	88	58.7	58.7	58.7
	2.00	21	14.0	14.0	72.7
	3.00	6	4.0	4.0	76.7
	4.00	11	7.3	7.3	84.0
	5.00	7	4.7	4.7	88.7
	6.00	3	2.0	2.0	90.7
	9.00	14	9.3	9.3	100.0
	Total	150	100.0	100.0	

Mean	2.473	Median	1.000	Mode	1.000
Std dev	2.460	Variance	6.050	Range	8.000
Minimum	1.000	Maximum	9.000		
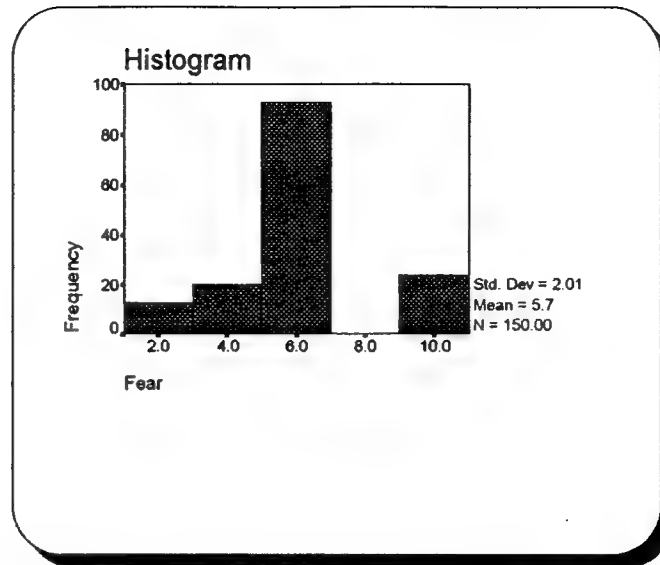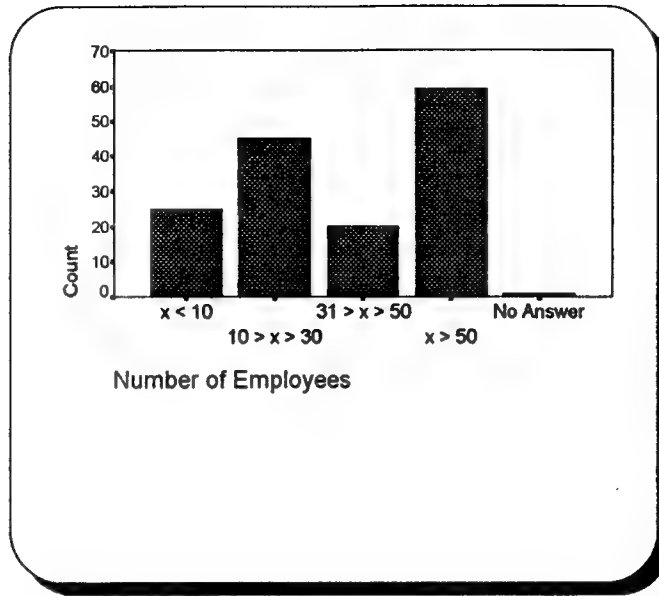
Valid cases   150   Missing cases   0

149

Histogram

Std. Dev = 2.01
Mean = 5.7
N = 150.00

Fear

Histogram

Std. Dev = 2.25
Mean = 4.8
N = 150.00

Access to Online Services

Histogram

Std. Dev = 2.46
Mean = 2.5
N = 150.00

Funding

Number of Employees

EMPLOYEE Number of Employees

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	25	16.7	16.7	16.7
	2.00	45	30.0	30.0	46.7
	3.00	20	13.3	13.3	60.0
	4.00	59	39.3	39.3	99.3
	9.00	1	.7	.7	100.0
		-------	-------	-------	
	Total	150	100.0	100.0	

Mean	2.800	Median	3.000	Mode		4.000
Std dev	1.253	Variance	1.570	Range		8.000
Minimum	1.000	Maximum	9.000			

Valid cases   150   Missing cases   0

152

Histogram

Frequency

Std. Dev = 1.25
Mean = 2.8
N = 150.00

Number of Employees

153
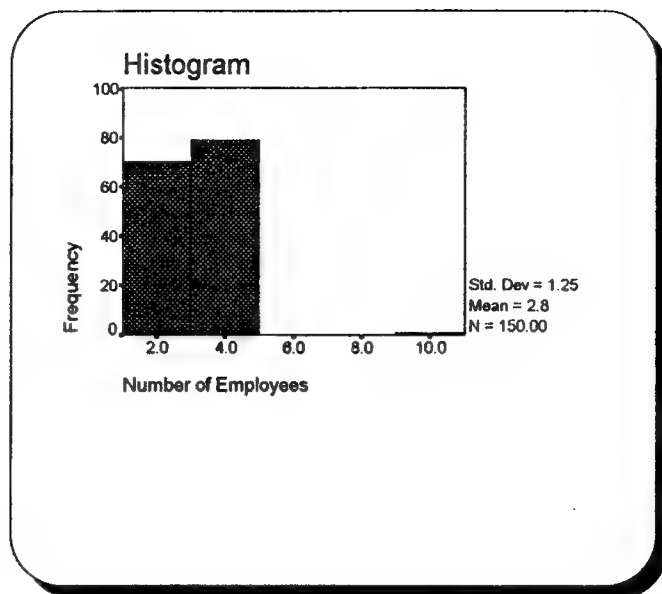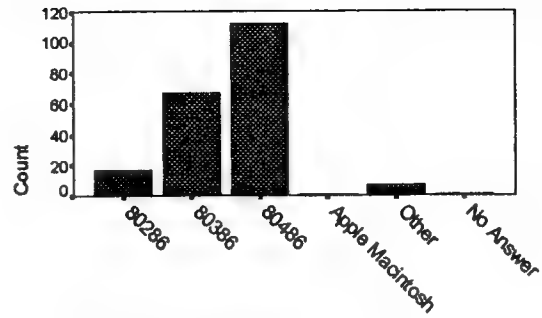
Computer Type
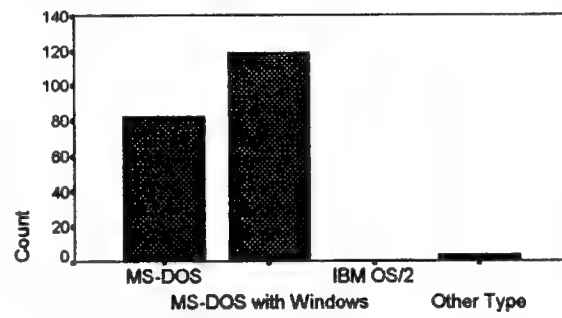
Operating System
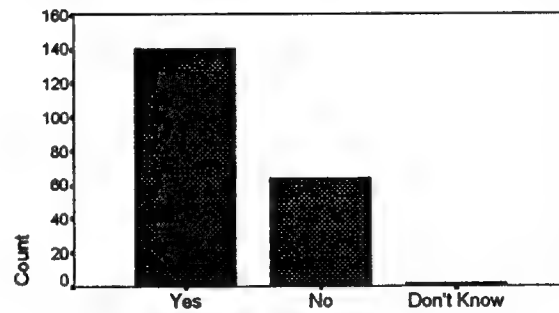
Local Area Network

DBMU Survey: DoD Study

COMPUTER   Computer

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	2.00	17	8.3	8.3	8.3
	3.00	67	32.5	32.5	40.8
	4.00	113	54.9	54.9	95.6
	6.00	1	.5	.5	96.1
	7.00	7	3.4	3.4	99.5
	9.00	1	.5	.5	100.0
	Total	206	100.0	100.0	

Mean	3.646	Median	4.000	Mode	4.000
Std dev	.991	Variance	.981	Range	7.000
Minimum	2.000	Maximum	9.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

OPERSYS   Operating System

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	82	39.8	39.8	39.8
	2.00	119	57.8	57.8	97.6
	4.00	1	.5	.5	98.1
	5.00	4	1.9	1.9	100.0
	Total	206	100.0	100.0	

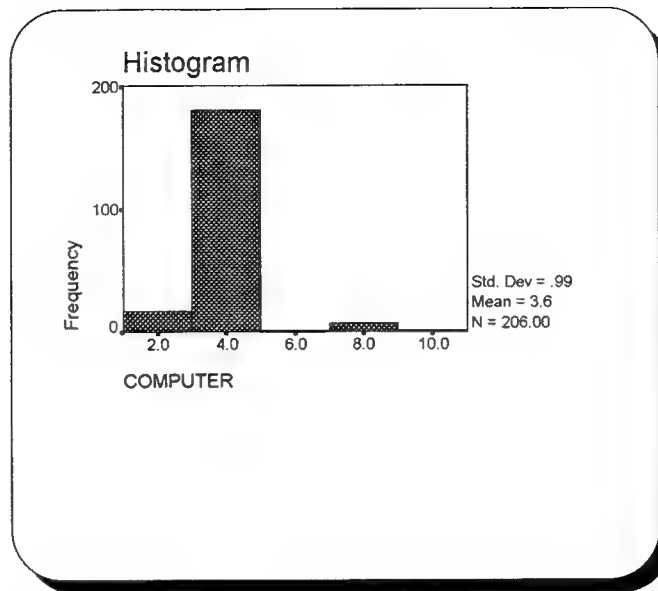| Mean	1.670	Median	2.000	Mode	2.000
Std dev	.697	Variance	.486	Range	4.000
Minimum	1.000	Maximum	5.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

LAN   Local Area Network

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	140	68.0	68.0	68.0
	2.00	64	31.1	31.1	99.0
	3.00	2	1.0	1.0	100.0
	Total	206	100.0	100.0	

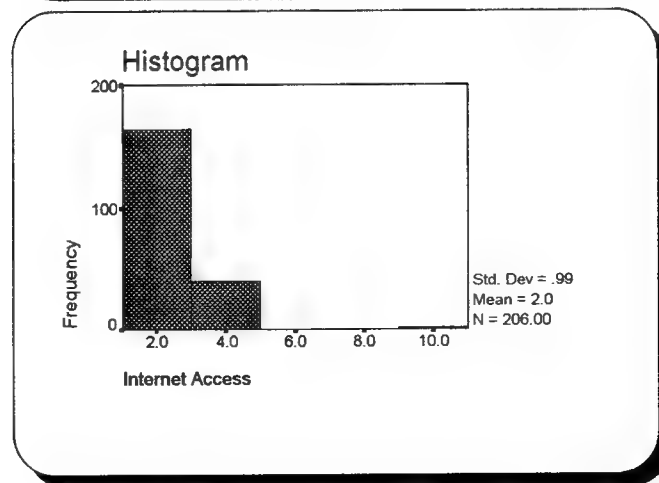| Mean	1.330	Median	1.000	Mode	1.000
Std dev	.492	Variance	.242	Range	2.000
Minimum	1.000	Maximum	3.000		

Valid cases   206   Missing cases   0

155

Histogram

Std. Dev = .99
Mean = 3.6
N = 206.00

COMPUTER

Histogram

Std. Dev = .70
Mean = 1.7
N = 206.00

Operating System

Histogram

Std. Dev = .49
Mean = 1.33
N = 206.00

Local Area Network

Computer has Modem

DDN Access

Internet Access (other than DDN)

157
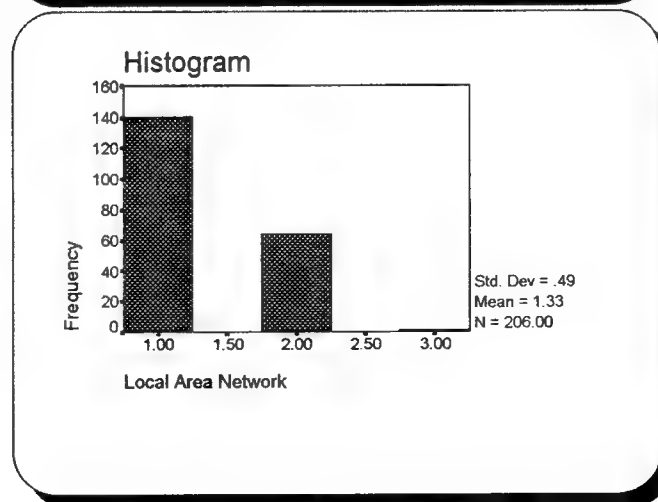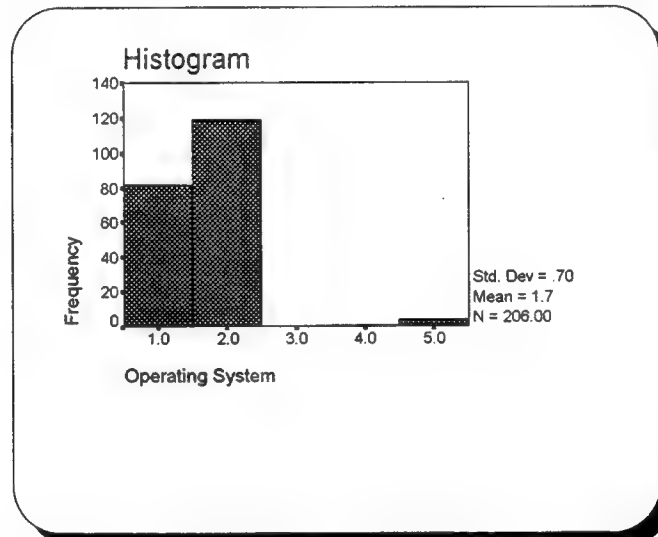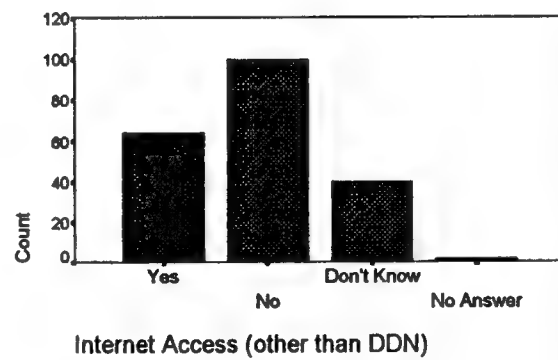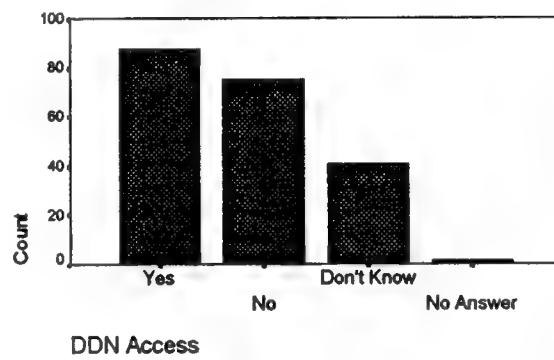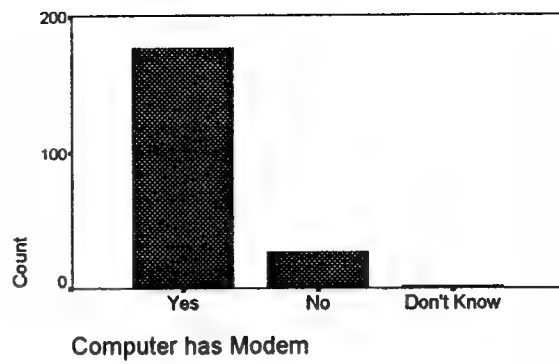
DBMU Survey: DoD Study

MODEM   Modem

| | | | | | Valid | Cum |
Value Label		Value	Frequency	Percent	Percent	Percent
		1.00	177	85.9	85.9	85.9
		2.00	27	13.1	13.1	99.0
		3.00	2	1.0	1.0	100.0
		Total	206	100.0	100.0	

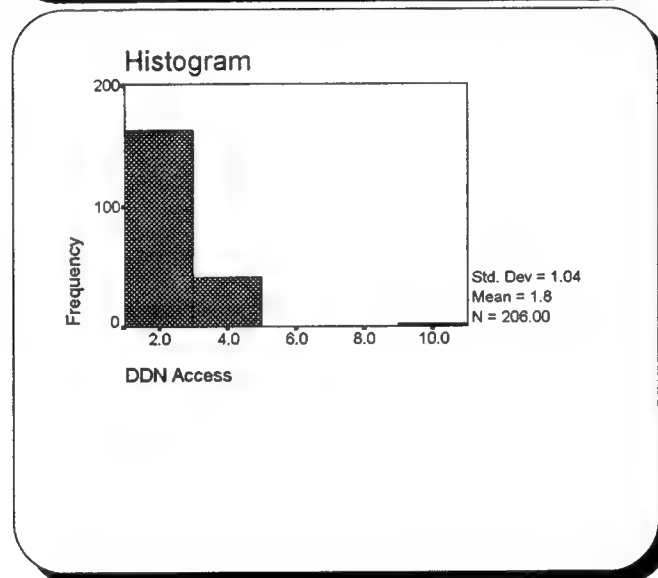| Mean	1.150	Median	1.000	Mode	1.000
Std dev	.385	Variance	.148	Range	2.000
Minimum	1.000	Maximum	3.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

DDN   DDN Access

| | | | | | Valid | Cum |
Value Label		Value	Frequency	Percent	Percent	Percent
		1.00	88	42.7	42.7	42.7
		2.00	75	36.4	36.4	79.1
		3.00	41	19.9	19.9	99.0
		9.00	2	1.0	1.0	100.0
		Total	206	100.0	100.0	

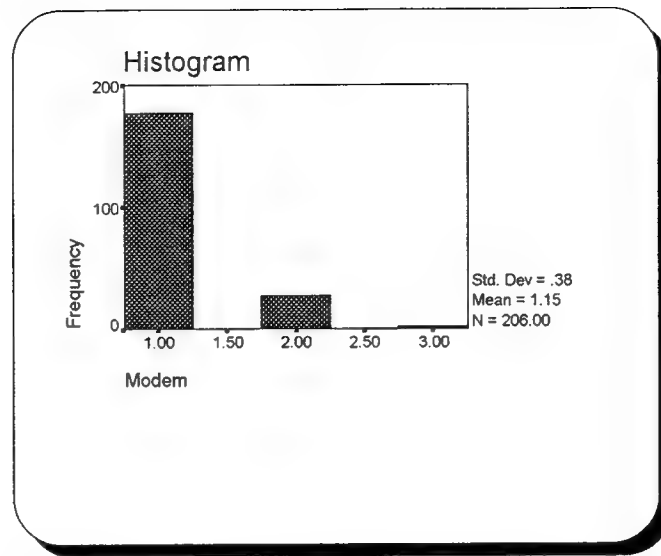| Mean	1.840	Median	2.000	Mode	1.000
Std dev	1.040	Variance	1.082	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

INTERNET   Internet Access

| | | | | | Valid | Cum |
Value Label		Value	Frequency	Percent	Percent	Percent
		1.00	64	31.1	31.1	31.1
		2.00	100	48.5	48.5	79.6
		3.00	40	19.4	19.4	99.0
		9.00	2	1.0	1.0	100.0
		Total	206	100.0	100.0	

Mean	1.951	Median	2.000	Mode	2.000
Std dev	.991	Variance	.983	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

158

Histogram — Modem

Std. Dev = .38
Mean = 1.15
N = 206.00

Histogram — DDN Access

Std. Dev = 1.04
Mean = 1.8
N = 206.00

Histogram — Internet Access

Std. Dev = .99
Mean = 2.0
N = 206.00

Multimedia Capable

Upgrade Plans

Electronic Information Distribution

160
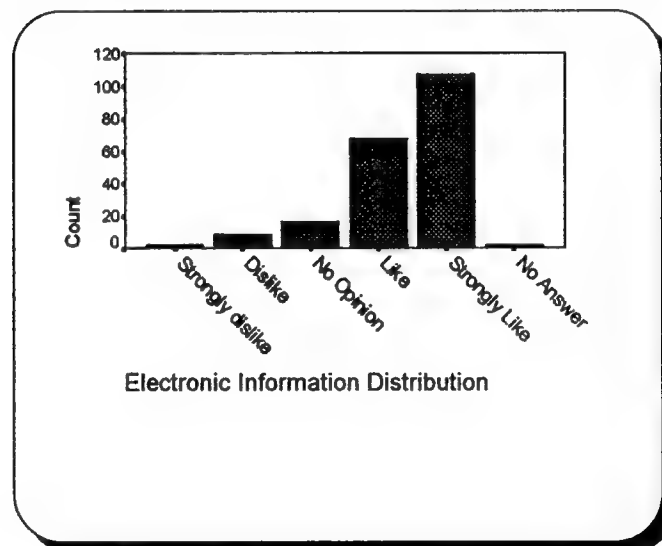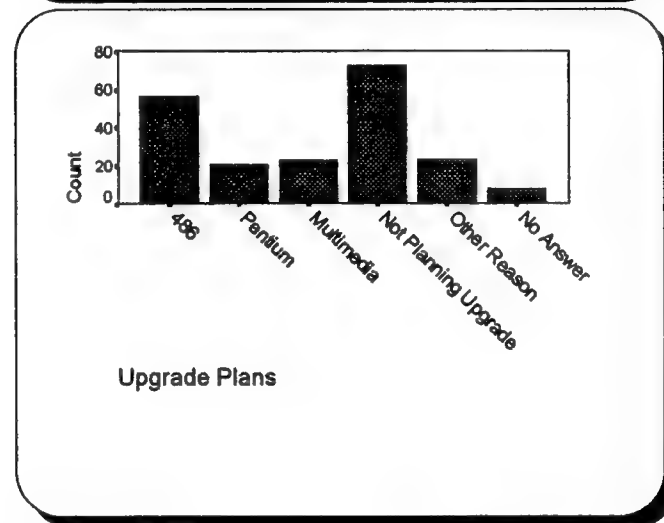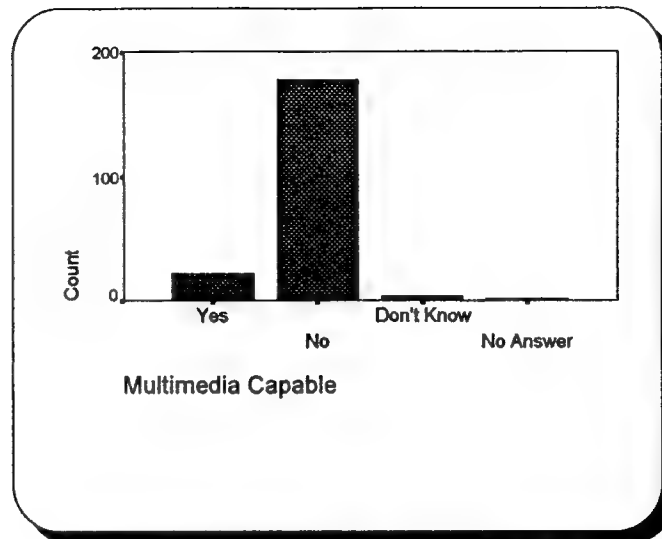
DBMU Survey: DoD Study

MMEDIA   Multimedia Capable

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	22	10.7	10.7	10.7
	2.00	178	86.4	86.4	97.1
	3.00	4	1.9	1.9	99.0
	9.00	2	1.0	1.0	100.0
	Total	206	100.0	100.0	

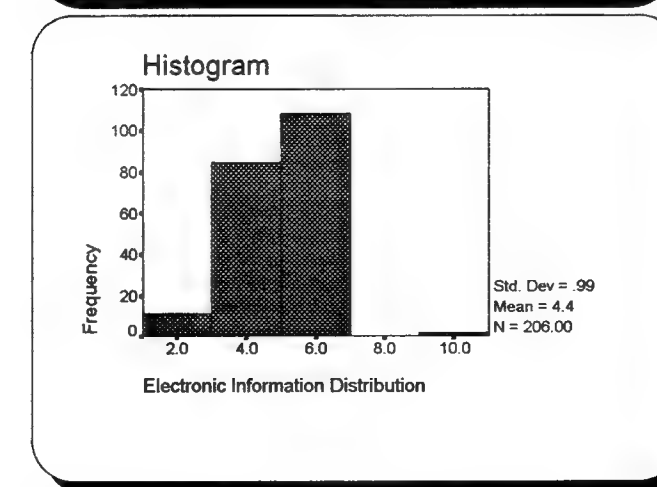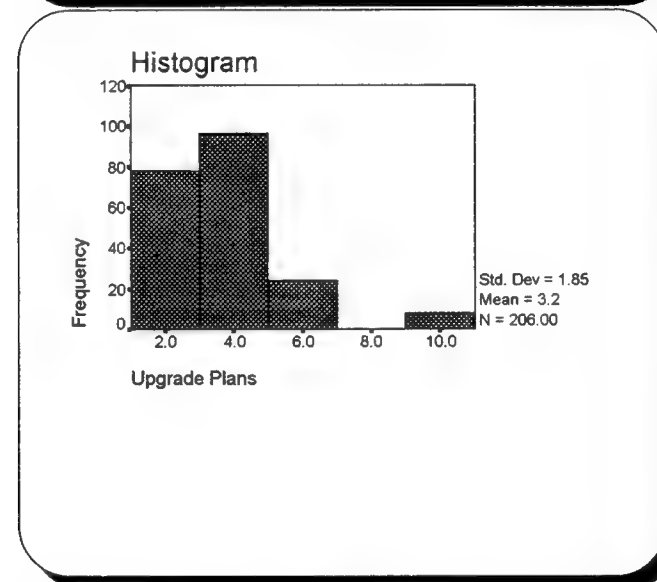|					
Mean	1.981	Median	2.000	Mode	2.000
Std dev	.777	Variance	.604	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

UPGRADE   Upgrade Plans

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	57	27.7	27.7	27.7
	2.00	21	10.2	10.2	37.9
	3.00	23	11.2	11.2	49.0
	4.00	73	35.4	35.4	84.5
	5.00	24	11.7	11.7	96.1
	9.00	8	3.9	3.9	100.0
	Total	206	100.0	100.0	

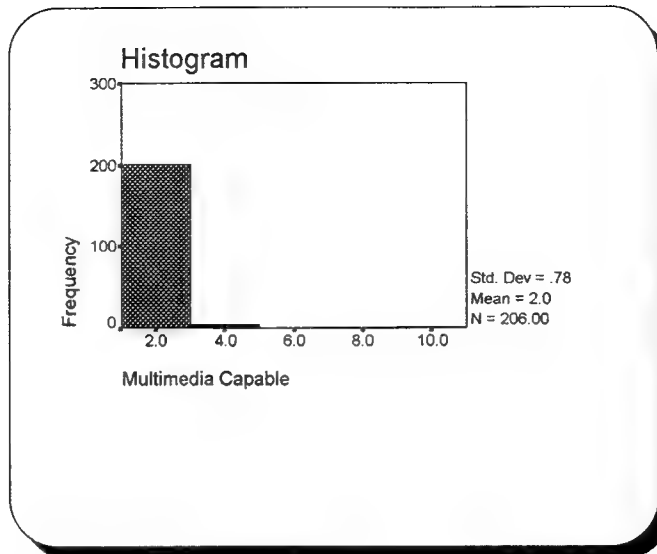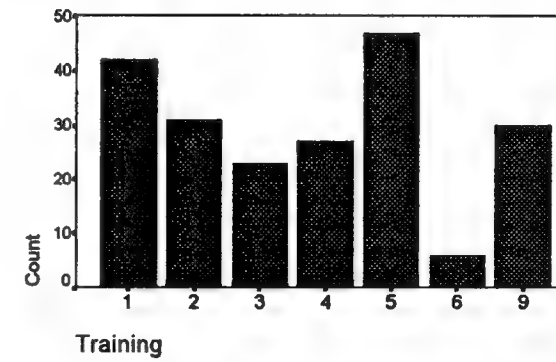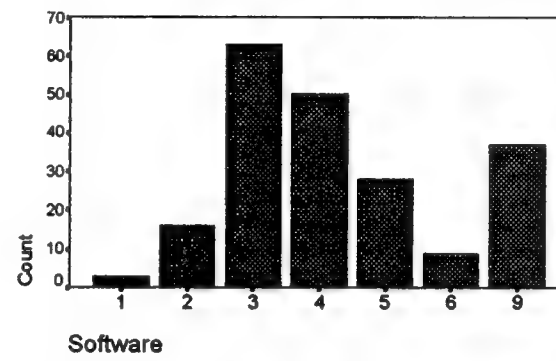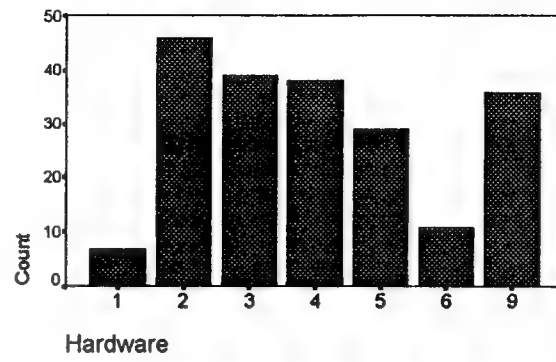|					
Mean	3.165	Median	4.000	Mode	4.000
Std dev	1.848	Variance	3.417	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

INFODIS   Electronic Information Distribution

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	2	1.0	1.0	1.0
	2.00	9	4.4	4.4	5.3
	3.00	17	8.3	8.3	13.6
	4.00	68	33.0	33.0	46.6
	5.00	108	52.4	52.4	99.0
	9.00	2	1.0	1.0	100.0
	Total	206	100.0	100.0	

Mean	4.374	Median	5.000	Mode	5.000
Std dev	.988	Variance	.977	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

161

Histogram

Std. Dev = .78
Mean = 2.0
N = 206.00

Multimedia Capable

Histogram

Std. Dev = 1.85
Mean = 3.2
N = 206.00

Upgrade Plans

Histogram

Std. Dev = .99
Mean = 4.4
N = 206.00

Electronic Information Distribution

163

DBMU Survey: DoD Study

HARDWARE   Hardware

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	7	3.4	3.4	3.4
	2.00	46	22.3	22.3	25.7
	3.00	39	18.9	18.9	44.7
	4.00	38	18.4	18.4	63.1
	5.00	29	14.1	14.1	77.2
	6.00	11	5.3	5.3	82.5
	9.00	36	17.5	17.5	100.0
	Total	206	100.0	100.0	

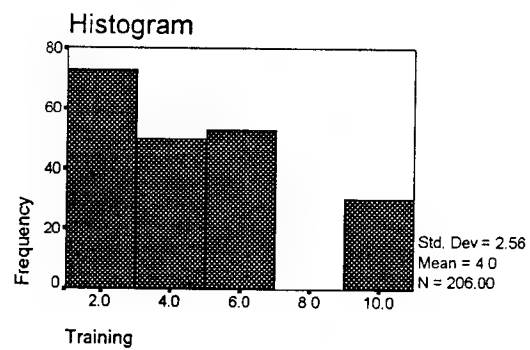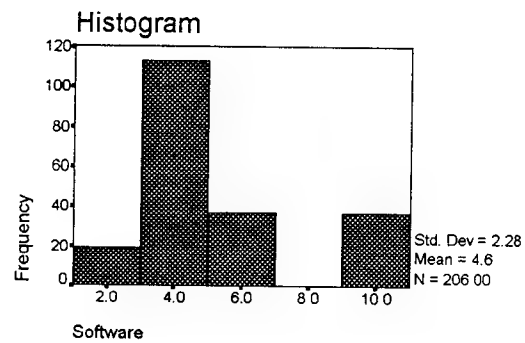| Mean	4.383	Median	4.000	Mode	2.000
Std dev	2.448	Variance	5.994	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

SOFTWARE   Software

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	3	1.5	1.5	1.5
	2.00	16	7.8	7.8	9.2
	3.00	63	30.6	30.6	39.8
	4.00	50	24.3	24.3	64.1
	5.00	28	13.6	13.6	77.7
	6.00	9	4.4	4.4	82.0
	9.00	37	18.0	18.0	100.0
	Total	206	100.0	100.0	

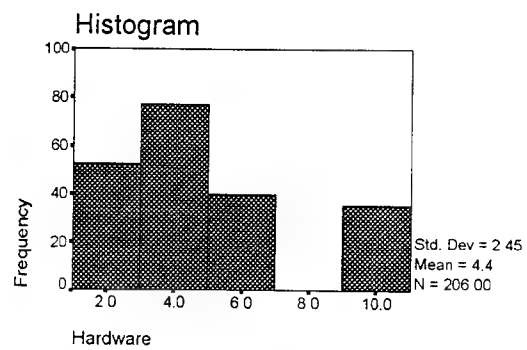| Mean	4.617	Median	4.000	Mode	3.000
Std dev	2.279	Variance	5.194	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

TRAINING   Training

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	42	20.4	20.4	20.4
	2.00	31	15.0	15.0	35.4
	3.00	23	11.2	11.2	46.6
	4.00	27	13.1	13.1	59.7
	5.00	47	22.8	22.8	82.5
	6.00	6	2.9	2.9	85.4
	9.00	30	14.6	14.6	100.0
	Total	206	100.0	100.0	

Mean	3.990	Median	4.000	Mode	5.000
Std dev	2.562	Variance	6.566	Range	8.000
Minimum	1.000	Maximum	9.000		

Valid cases   206   Missing cases   0

164

Histogram

Hardware
Std. Dev = 2.45
Mean = 4.4
N = 206.00

Histogram

Software
Std. Dev = 2.28
Mean = 4.6
N = 206.00

Histogram

Training
Std. Dev = 2.56
Mean = 4.0
N = 206.00
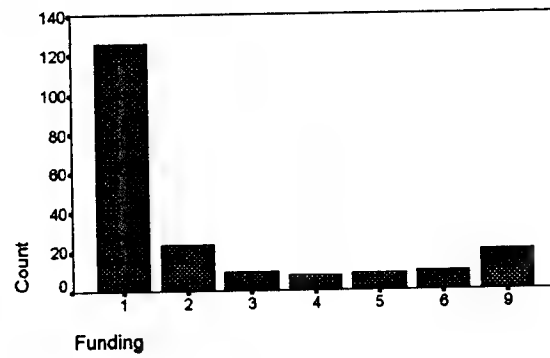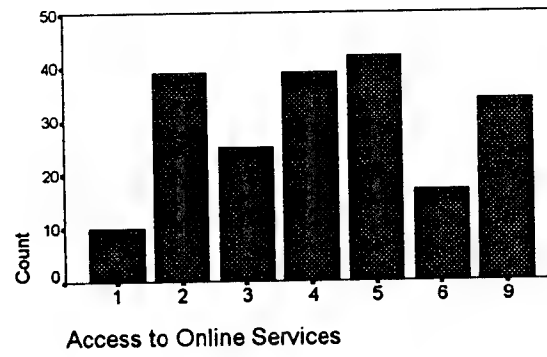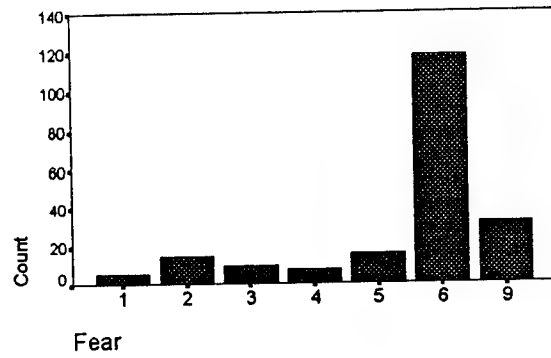
DBMU Survey: DoD Study

FEAR   Fear

Value Label		Value	Frequency	Percent	Valid Percent	Cum Percent
		1.00	6	2.9	2.9	2.9
		2.00	15	7.3	7.3	10.2
		3.00	10	4.9	4.9	15.0
		4.00	8	3.9	3.9	18.9
		5.00	16	7.8	7.8	26.7
		6.00	118	57.3	57.3	84.0
		9.00	33	16.0	16.0	100.0
		Total	206	100.0	100.0	

Mean	5.743	Median	6.000	Mode	6.000	
Std dev	1.989	Variance	3.958	Range	8.000	
Minimum	1.000	Maximum	9.000			

Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

ACCESSOL   Access to Online Services

Value Label		Value	Frequency	Percent	Valid Percent	Cum Percent
		1.00	10	4.9	4.9	4.9
		2.00	39	18.9	18.9	23.8
		3.00	25	12.1	12.1	35.9
		4.00	39	18.9	18.9	54.9
		5.00	42	20.4	20.4	75.2
		6.00	17	8.3	8.3	83.5
		9.00	34	16.5	16.5	100.0
		Total	206	100.0	100.0	

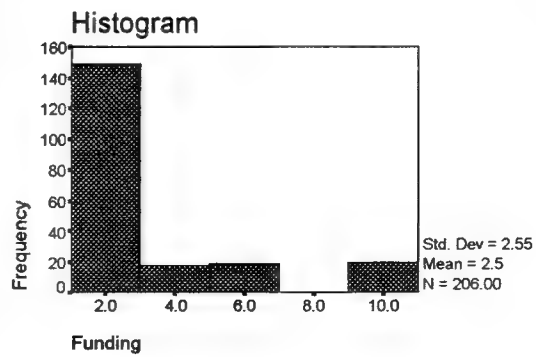|						
Mean	4.549	Median	4.000	Mode	5.000	
Std dev	2.388	Variance	5.703	Range	8.000	
Minimum	1.000	Maximum	9.000			

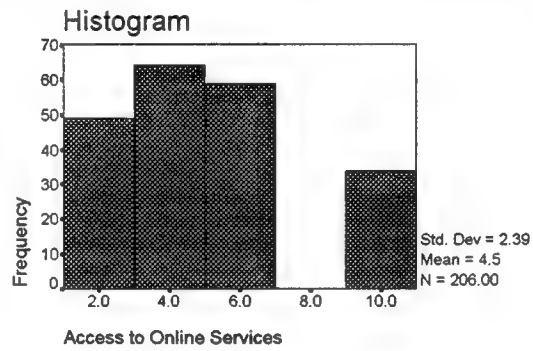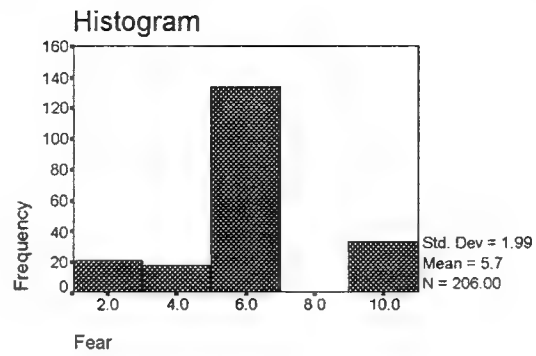Valid cases   206   Missing cases   0

DBMU Survey: DoD Study

FUNDING   Funding

Value Label		Value	Frequency	Percent	Valid Percent	Cum Percent
		1.00	126	61.2	61.2	61.2
		2.00	23	11.2	11.2	72.3
		3.00	10	4.9	4.9	77.2
		4.00	8	3.9	3.9	81.1
		5.00	9	4.4	4.4	85.4
		6.00	10	4.9	4.9	90.3
		9.00	20	9.7	9.7	100.0
		Total	206	100.0	100.0	

Mean	2.519	Median	1.000	Mode	1.000	
Std dev	2.550	Variance	6.504	Range	8.000	
Minimum	1.000	Maximum	9.000			
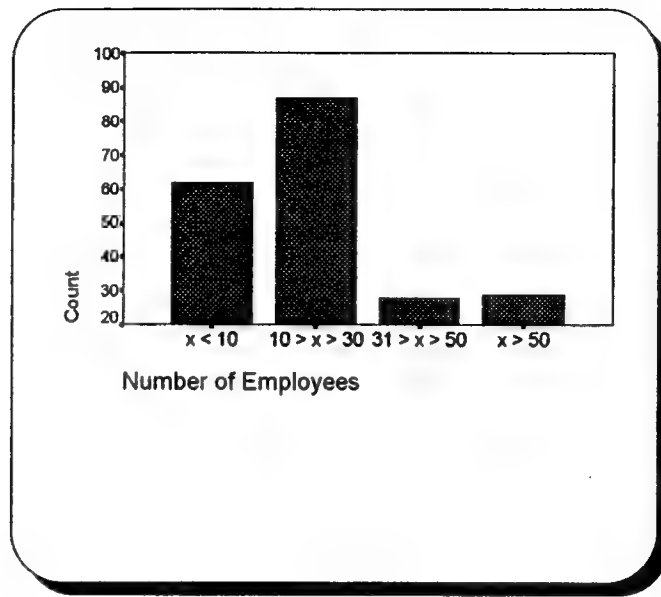
Valid cases   206   Missing cases   0

Histogram

Fear

Std. Dev = 1.99
Mean = 5.7
N = 206.00

Histogram

Access to Online Services

Std. Dev = 2.39
Mean = 4.5
N = 206.00

Histogram

Funding

Std. Dev = 2.55
Mean = 2.5
N = 206.00

168

Count

100
90
80
70
60
50
40
30
20

x < 10   10 > x > 30   31 > x > 50   x > 50

Number of Employees

EMPLOYEE   Number of Employees

Value Label		Value	Frequency	Percent	Valid Percent	Cum Percent
		1.00	62	30.1	30.1	30.1
		2.00	87	42.2	42.2	72.3
		3.00	28	13.6	13.6	85.9
		4.00	29	14.1	14.1	100.0
			-------	-------	-------	
		Total	206	100.0	100.0	

Mean	2.117	Median	2.000	Mode		2.000
Std dev	.996	Variance	.991	Range		3.000
Minimum	1.000	Maximum	4.000			

Valid cases   206   Missing cases   0

Histogram

Std. Dev = 1.00
Mean = 2.1
N = 206.00

Number of Employees
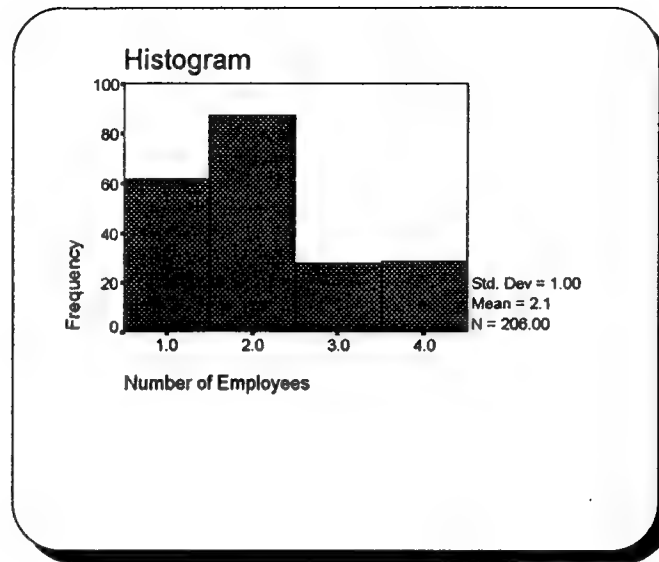
APPENDIX E. INTERNET CONNECTIVITY MAP
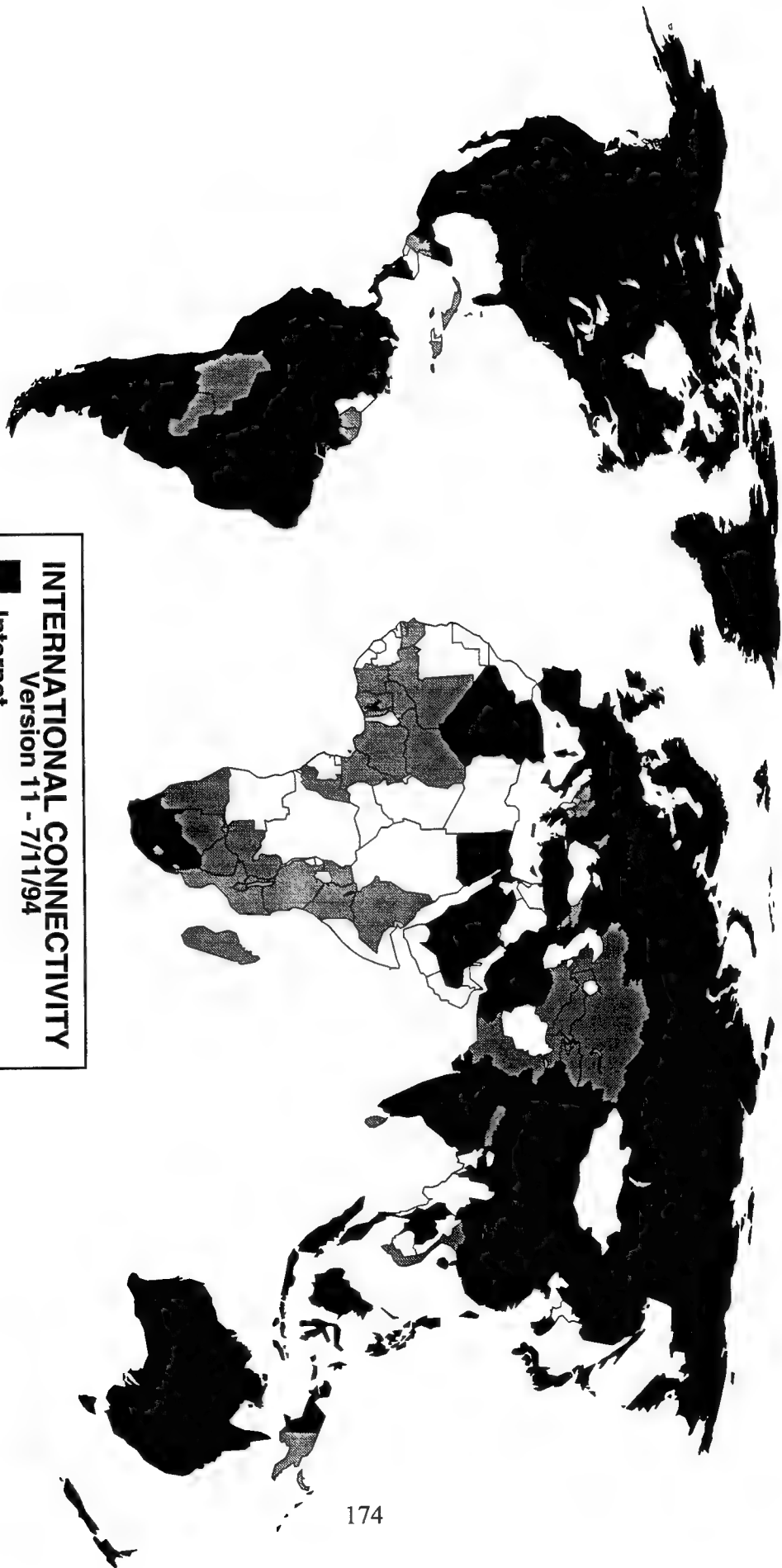
INTERNATIONAL CONNECTIVITY
Version 11 - 7/11/94

- ■ Internet
- ■ Bitnet but not Internet
- ▨ EMail Only (UUCP, FidoNet, or OSI)
- □ No Connectivity

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   Austin, Texas 78747

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